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TABLE OF CONTENTS ON LAST PAGE OF READING.

A SETBACK TO FILIPINO PROGRESS.

It has been an open secret that for some months past American capitalists have been striving to reach some agreement whereby acreage of jungle land could be secured to plant rubber on a scale comparable with Far Eastern enterprises.

The rubber offer was to plant 100,000 acres in Mindanao, and incidentally to establish a factory in Manila. At the same time another group wished to acquire sufficient wild land to install a vast camphor plantation. These two offers were the result of Filipino propaganda asking for American capital and the assurance from prominent officials that every facility would be afforded to investors.

The stumbling blocks were the existing law that no company can acquire more than 2,500 acres and the law against the importation of Chinese or other plantation laborers. These laws the Filipinos refused to amend. The offers have been therefore withdrawn, and the Philippines lose their chance probably for all time.

One would like to comment severely on the crass folly of such a course. The Filipinos clamor for capital and make investment impossible; they agitate for independence and show absolute incapacity for self-government. They are ready for neither.

GUAYULE IS RUBBER, NOT A "SUBSTITUTE."

One of our esteemed contemporaries, in an otherwise excellent article on "Attempts at Rubber Substitutes" hardly does justice to guayule; indeed, leaves the reader with the impression that it is poor stuff at best. Speaking of Mexican beginnings, he says:

> "This experimentation resulted in a certain measure of success in that a low grade material was manufactured which was a capable substitute for the poorest grades of rubber."

The poorest grade of rubber is perhaps untreated pontianak or jelutong, which at one time was a drug on the market at 4 to 6 cents a pound. Even in its beginnings guayule was worth much more than that. It was, of course, a "capable substitute" for low grade rubber, but so was Pará rubber. It is not, however, low grade. On the contrary, well prepared guayule is classed among the medium rubbers.

Farther on the writer says:

> "One mill was built in Torreon, in the State of Coahuila, where business was carried on successfully for some time. At the period of its greatest prosperity about 600,000 pounds of rubber, or whatever this low grade material might be called, was turned out each month."

The Torreon product was sold as rubber for the very good reason that it was rubber and a very excellent product at that. Certain of the old timers were against it from the first and insisted that it was a substitute and that in spite of the fact that any fair definition of the word "rubber" must perforce include guayule.

At present guayule is quiescent but, our contemporary to the contrary nothwithstanding, it will again be a big factor and that within a decade.

BALATA CULTIVATION.

Rubber cultivation is so big and so successful that it is to-day a commonplace achievement. This in spite of the fact that it was deemed a "pipe dream" by trade leaders during its beginnings. The needs of the world brought it about just as the need for plastics, gutta percha, balata and chicle will in turn bring about plantations that produce these gums.

Of course the problem is a more difficult one. The *Sapotaceae* are slow-growing trees and the product is not large. Nor do any of them show the "wound response" that proved such a boon for the *Hevea* planter. Nevertheless, one should not forget the large gutta percha plantations in Java instituted by the farsighted Dutch.

It is also gratifying to note that balata is being grown in the Dutch East Indies in a small way, to be sure, but it is a beginning. The British Government

is also doing its bit in using the "bully tree" in reforesting in the West Indies and in its African possessions.

The *Mimusops balata*, while it does not produce a gutta equal to that from the *Palaquium*, has an advantage in that the wood is of great value for building purposes.

Now if chicle could have its turn and become a plantation product the *Sapotads* would be receiving at least a fair chance.

AIR FORDS NOT AS YET.

THE CREATION by one of the big rubber companies of a pony blimp or "flyabout" has been hailed by some of the semi-wise as the beginning of an era when air travel will challenge earth travel. They assume to see a development akin to that of the Ford car in the motor world. It would of course be wonderful were it within the realm of reality but alas it is not, nor will it be in this generation. England experienced the same visions and dismissed them.

A recent report on this subject from abroad places the minimum price of the small blimp at fifty thousand dollars. As against the five hundred charged for the first Fords the difference is appalling. Indeed, in spite of the wealth the laborers are piling up day by day, and their courage in spending, few will feel able to purchase "flyabouts."

ACCIDENTS IN FACTORIES.

THE URGENT NEED of a more aggressive "Safety First" campaign by American industrial leaders was strikingly emphasized in reports submitted at the first annual Massachusetts Accident Prevention Congress. One of the speakers, C. W. Price, general manager of the National Safety Council, Chicago, and who was connected with the National Harvester Co., said that of the 2,000,000 American boys who in nineteen months went overseas in the Great War 47,949 were killed or died from wounds received in battle. Yet, he said, in the same period "126,000 men, women, and children were killed, 35,000 in industry, and 91,000 outside industry, 25,000 of the latter being children. In other words, during those nineteen months our boys were fighting on the other side of the water, there were 220 people killed in this country every twenty-four hours; and it would take a ditch forty-eight miles long and as wide as the ordinary sidewalk to hold the bodies of those 126,000 men, women, and children."

Such sacrifice of human life in the pursuits of peace, and depletion of labor that was never more urgently needed, were to a great extent avoidable, said Mr. Price, who quoted figures to prove that of 22,000 serious accidents reported by industry in 1919, fully 16,500 were preventable. He said that in 1,000 industries reporting, reductions of from 50 to 75 per cent in deaths had been effected by joint cooperation of employers and employes, about one-third of the good work being accomplished by means of mechanical devices and the remainder by enlisting the active aid of shop foremen.

That effective safety work not only spared manufacturers large losses in death and accident claims, but actually helped in dividends was another contention of the speaker. Enlightened employers have found that the safety movement wins workers and gives a dignified standing to business life, as well as being a sound, profitable business proposition. While he was pleased to note much progress, the speaker lamented the fact that a recent survey showed that scarcely one concern in ten develops a proper cooperative spirit among its employes, whereby they can feel that their employers take a real, personal interest in their welfare and will second every effort they make to safeguard human life and limb.

STANDARDIZATION AND GOLF BALLS.

A LEATHER BALL stuffed with feathers, at one time led all others in the game of golf. Had this ball been standardized, in other words, if no golf matches could be played except with the feather-filled ball, it would doubtless still be used. And—the solid gutta and the Haskell would never have been known.

The corollary is that to standardize the present rubber-cored ball is to kill its successor, a lively durable ball that will sell at 20 cents instead of a dollar.

THAT THE UNITED STATES IS NOW AT THE PEAK OF ITS crude oil production is an accepted fact. Despite the energetic efforts being made to augment production and to discover new sources, the result does not warrant the belief that it can long offset the constant growth in demand for oil and its products. This means that solvent naphtha, of which the rubber industry is a large consumer, will be produced in steadily diminishing quantities unless some new source of supply is discovered.

STAID BRITISHERS MAY NOT MUCH LONGER REFER reproachfully to the "gum-chewing Yankees," for, judging by the trade statistics, their own fellow-countrymen are fast becoming Americanized in at least this one respect. Chicle, once used in England as an adulterant of gutta percha, is now consumed there to almost as large an extent in the form of chewing gum. The change has come about almost wholly through the Great War. Munition factory workers especially cultivated a taste for the American product, and its popularity spread rapidly among the soldiers, giving comfort to the men on long marches or in the front trenches in France and Flanders where smoking was forbidden. During the last year of the war, 1918, England bought $1,119,898 of the total of $1,695,903 exported by the United States. The amount fell to $771,144 in 1919, but 1920 is expected to show a large increase in sales of American chewing gum in the United Kingdom.

TYPE OF PUBLIC LAND STILL AVAILABLE FOR LEASE OR PURCHASE ON BASILAN ISLAND, ZAMBOANGA PROVINCE. PROVED RUBBER COUNTRY. ABOUT 90 PER CENT UNDER COGAN GRASS.

Rubber (Hevea Brasiliensis) as a Philippine Agricultural Investment.

By H. F. Cameron, Lieutenant-Colonel, Engineers, U. S. A.

GENERAL OUTLINE.

THE PROPOSITION outlined hereafter pertains to the production of plantation rubber (*Hevea brasiliensis*) as an agricultural venture for the southern part of the Philippine Islands.

LAWS.

The land laws (Organic Act of 1902) permit an individual or a corporation to secure a fifty-year lease (25 years original and 25 years renewal) of twenty-five hundred (2,500) acres of public land, while a corporation (three or more persons) may purchase at an appraised value, generally of $2 an acre, after advertising and bidding. The annual lease rental approximates $0.10 an acre for the first ten years, with increase upon new appraisements made periodically.

These laws forbid the import of contract unskilled labor. The Insular Government does, however, contract with Americans for duty in the Philippines and has brought in Javanese skilled laborers for instruction or educational purposes. The irrigation and water power laws are liberal and sufficient for economical agricultural or industrial operation.

LOCATION.

The Provinces of Zamboanga, Cotabato and Davao (and small sections adjacent thereto), Department of Mindanao and Sulu, Philippine Islands, have been selected, after a thorough personal investigation of the entire Archipelago, as best adapted in land, labor and other economic factors to produce the highest returns for money invested in plantation rubber. This territory is included within North Latitude 5° to 8°, and West Longitude 121° to 127°.

CONDITIONS.

The soil in these sections is alluvial and mostly of volcanic origin; very rich in humus; in the open areas free from fungus growths and beetle breeding, decaying stumps or roots; and capable of constant refertilization from the adjacent mountain washes or the silty rivers available for irrigation and power purposes.

Of the available areas, some are already under cultivation by corporations or individuals who have acquired titles under the laws of the Philippines, while other areas may be leased or purchased as desired.

The climatic conditions of this section are peculiarly favorable to obtaining rubber production. The temperature ranges from 75 to 92 degrees; the relative humidity 70 to 85 degrees; the annual rainfall is well distributed and averages from 70 inches on Basilan Island, Zamboanga Province, on the west, to 140 inches at the foothills on either side of the low watershed extending south from Mount Apo to Matutun in Cotabato and Davao Provinces; on the west slope of the watershed (Kidapaun and Kabakan) rainfall in the morning is unusual; the entire area is out of the typhoon belt, while the droughts, common to all tropical countries, are no worse here than in other tropical possessions.

LABOR.

The last census for the Philippine Islands shows a population of 10,320,000. The center of population appears to be in the north Visayan Islands, Cebu Island having the largest population per square mile, approximately 350. Mandanao, on the contrary, the only possible plantation rubber producing land of the Philippine Islands, or even under the shadow of the American flag, has the smallest population per square mile, approximately 18.

The unskilled labor wage in the Philippine Islands varies with the locality and in accordance with the economic law of supply and demand—from $0.30 a day to $0.60, the latter price in the agricultural sections of Mindanao.

GOVERNMENT.

The Organic Act of 1902, which included land, mineral and labor laws that are still in force, did not provide for the economic developments that were beyond the poor man to handle and yet not sufficient for the industrial user to become interested. Rubber is a commodity in point. The poor man can get a quick financial return for his investment in corn, rice, sugar and cotton; it is a matter of six to nine months. He may develop cocoanuts successfully through the five or seven years to production by the use of catch crops, but in rubber, which requires approximately $200 an acre to bring to production, and a few other commodities the poor man has no catch crop opportunity and six or seven years is a long period to carry the financing when one has no other source of income than the agricultural returns from this land.

GOVERNMENT ATTITUDE TOWARDS CAPITAL.

The Philippine government officials realize that they themselves have not the capital to quickly develop the islands in agriculture, industry and commerce. That they do desire this development in accordance with existing laws is evident from the large government loans made (aggregating millions of pesos) to going concerns that were in financial difficulty. They prefer, however, industries that can operate under the present laws and where the Filipino can own the land. The sugar central idea is an extremely popular example of this development. For rubber and similar commodities, however, their laws were so framed by

early American administration that operation is possible only on a small scale—too small for either success or to interest capital.

Although the progressive Filipino realizes the economic features involved, his constructive efforts to remedy a situation to which he was never a party, have so far been unsuccessful. He still persists, however, and it is believed that his efforts will shortly be crowned with success.

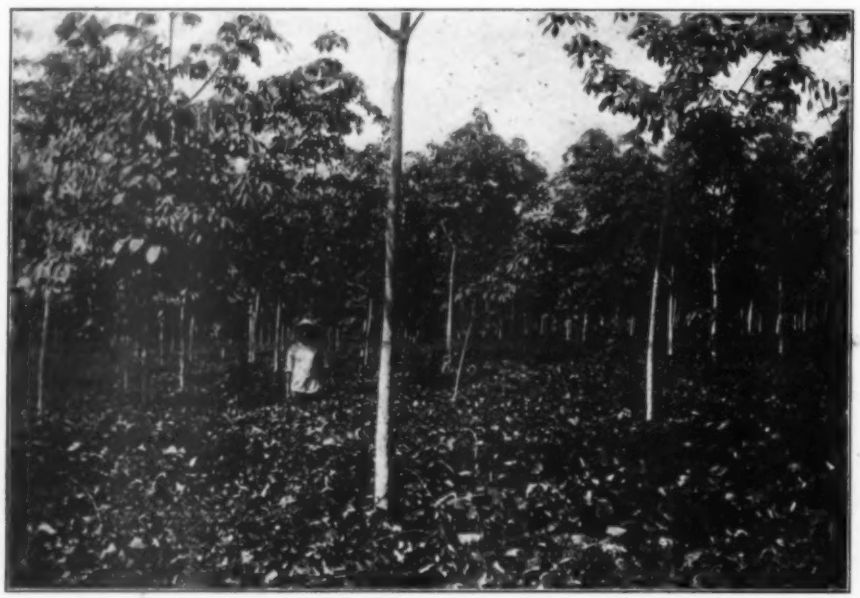
RUBBER FACTS.

The main essentials for a successful rubber plantation are:

(a) A cheap, abundant and dependable labor supply.
(b) Large areas of well-drained soil in a proved rubber country.
(c) Care in seed selection and the tree elimination with age.
(d) An annual, well-distributed rainfall of over 60 inches with freedom from morning rains.
(e) A temperature above 70 degrees F. and a relatively high humidity.
(f) Freedom from winds.
(g) Tree protection against deer, wild boar and other bark attacks.
(h) Good land and sea transportation for export and import.
(i) Favorable land leases or titles, taxes, and governmental attitude.
(j) Efficient management.

The answer to these essential needs is:

That the labor is not at present adequate for a large acreage development in either supply or wage. For a large acreage—40,000 hectares—the immediate call for the hard work would be for 10,000 to 20,000 laborers. To secure this number in the Philippines quickly, if it were possible, would result in curtailment of production in other necessary lines, accompanied by a raise in wages that would make competition with Dutch Far East colonies still more unfavorable. The present increase in Philippine population does not keep pace with their development, and, until the laws are amended to permit entry of abundant cheap labor, and this condition is remedied, a rubber plantation under present Far Eastern competitive conditions will not be successful.



THREE YEAR OLD RUBBER, BASILAN, SHOWING PATANI BEAN COVER.

Relative to large areas needed it is only necessary to state that the use of rubber is in its infancy. The United States uses about 75 per cent of the world's rubber, almost all of which comes through New York and London markets. The maximum producing age of a plantation is reached somewhere between its tenth and fifteenth year—the original 100 or 120 trees an acre originally planted being reduced by elimination as the trees and root systems expand. Although the individual tree under proper treatment produces more latex with each year of age, this increase per acre after the tenth year remains almost constant, due to trees eliminated. The 1920 requirements for one large rubber factory are 120,000,000 pounds of rubber, which is the maximum output of approximately 100,000 hectares of land. Therefore, one sees the uselessness of talking in 2,500-acre (present maximum acreage possible to obtain under law) developments, which, under the maximum possible production would give operation to this factory less than four days a year.

In Java, in instances where rubber trees have been watched, recorded and rated like pedigreed cows for quantity and quality of latex produced, the result of seed selection and budding of tested poor producing young trees with cuttings from high producing trees, the result on an acre of trees over ten years of age is 500 pounds of rubber per acre per year. This, therefore, should be an important consideration in a new development.

The rainfall, temperature, humidity and freedom from wind conditions pertaining to the southern Philippines is more favorable in certain sections than others.

The protection of trees against destruction by animals, fire, or other causes during development is easily furnished by fencing and proper maintenance.

The transportation facilities on land and sea are construction features only. Local conditions are extremely favorable in this respect.

The land leases and titles for areas over 1,000 hectares (2,500 acres) cannot be obtained except by purchase of old church or Spanish concessions, none of which are in this section.

The taxes are very favorable while the government's attitude has always been kindly and helpful. There is no reason to believe that it will ever be otherwise.

Efficient management is very important here as elsewhere in the tropics. The selection of representatives who know local conditions as to laws, officials, labor and customs is essential.

ESTIMATE TO DEVELOP 1,000 HECTARES (2,500 ACRES).

In this estimate of cost to develop a 1000-hectare (2500 acres) rubber (*Hevea brasiliensis*) plantation in the Philippines the experience of the Dutch Netherlands and English colonies in the Far East as well as that of going concerns in the Philippines has been considered. It is recommended from possible fungus considerations, as well as initial development cost, that heavy jungle areas be avoided and that cogan (a tall fibrous grass) land be selected and that, to keep down weeds, to make for the most economical maintenance, Patani bean (an evergreen with fertilizing and fire resisting qualities which is disliked by wild animals) be planted.

To make this estimate on a business basis it will be assumed that the rubber selling value will be $0.40 a pound (present price is over $0.60 a pound); that the plantation will be fully cleared and planted in two years and that a less than maximum acre year production will result. The following estimates are the result of careful consideration based on practical knowledge.

	Debit.	Credit.
FIRST YEAR.		
Land purchase 2,500 acres @ $2, 1st payment 25%.....	$1,250	
Clearing, plowing, planting 1,000 acres land, which is 90% cogan @ $25.....	25,000	
Fencing 1,000 acres @ $3.....	3,000	
Tools, cattle, etc., using native methods.....	10,000	
Superintendence and administration:		
General superintendent $8,000		
Four white foremen @ $1,800..... 7,200		
Cashier and bookkeeper..... 2,400		
Office assistants (native), stationery, furniture, etc. 5,000		
	22,600	
Miscellaneous, such as surveys, roads, wharves, launch, water supply, drainage, doctor, medicine, etc.....	20,000	
Superintendent's bungalow and furniture.....	2,000	
White men's quarters.....	1,500	
Laborers' quarters first year.....	1,500	
Office and store—two-story.....	2,000	
Store with stock.....	3,000	
Tools and cattle sheds.....	1,500	
Hospital and equipment	5,000	
Interest on $100,000 @ 6%.....	6,000	
Total expenditures	$104,350	
Profits from store first year.....		$10,000
	10,000	
Cost of first year's development.....	$94,350	
SECOND YEAR.		
Second payment on land purchase.....	$1,250	
Clearing, plowing, planting 1,500 acres @ $25.....	37,500	
Fencing 1,500 acres @ $3.....	4,500	
Maintenance of 1,000 acres, second year @ $4.....	4,000	
Tools, cattle, etc., using native methods.....	10,000	
Superintendents and administration.....	25,000	
Miscellaneous	15,000	
Interest at 6% on $200,000.....	12,000	
Total expenditure.....	$109,250	
Store profit for second year.....		15,000
	15,000	
Cost of second year's development.....	$97,250	
THIRD YEAR.		
Third payment on land purchase.....	$1,250	
Tools, cattle, etc.....	5,000	
Maintenance of 2,500 acres @ $4.....	10,000	
Superintendence and administration.....	25,000	
Miscellaneous	10,000	
Interest on $250,000 @ 6%.....	15,000	
Total expenditure	$66,250	
Store profits for third year.....		15,000
	15,000	
Cost of third year's development.....	$51,250	
FOURTH YEAR.		
Last payment on land purchase.....	$1,250	
Tools, cattle, etc.....	5,000	
Maintenance of 2,500 acres @ $4.....	10,000	
Superintendence and administration.....	25,000	
One-third cost of crêpe plant to be designed for full development but installed as needed:		
2 Universal washers $6,000		
30 macerating, crêping and finishing mills..... 25,000		
400-h.-p. steam plant..... 9,000		
$40,000	14,000	
Note.—If hydroelectric probably $10,000 higher first cost against cheaper maintenance and operation later.		
Miscellaneous	10,000	
Interest on $300,000 @ 6%.....	18,000	
Total expenditure	$93,250	
Store profit for fourth year.....		15,000
	15,000	
Cost of fourth year's development.....	$78,250	
FOURTH YEAR.		
Tools and cattle, including tapping implements, etc.....	$10,000	
Maintenance of 2,500 acres @ $3.....	7,500	
Plant operation and tapping 100,000 trees.....	30,000	
Superintendence and administration.....	25,000	
Half cost on:		
2 buildings, 120' x 5' two-story with drying system with cement floors..... $10,000		
2 buildings, 120' x 50' for smoke..... 5,000		
1 building, 150' x75' one story, cement floor for crêpe plant..... 5,000		
1 building, 150' x 75' with cement floor for coagulation plant 5,000		
1 building, 120' x 60' single story, cement floor for grading and packing..... 4,000		
1 building, 100' x 50' single story, cement floor for box factory and repair..... 4,000		
$33,000		
One-half cost applied this year.....	16,500	
Second payment crêpe plant machinery (½ cost).....	13,000	
Miscellaneous	10,000	
Interest on $400,000 @ 6%.....	24,000	
Total expenditure	$136,000	

Rubber returns 100,000 × ¾ lb. @ $0.40.....		30,000
Profit on store for fifth year.....		15,000
	45,000	
Cost of fifth year's development.....	$91,000	
SIXTH YEAR.		
Tools, cattle, including tapping equipment.....	$10,000	
Maintenance of plantation.....	7,500	
Plant operation and tapping 250,000 trees.....	70,000	
Superintendence and administration.....	25,000	
Final cost of crêpe machinery (⅓ cost).....	13,000	
Final cost of buildings (⅓ cost).....	15,500	
Miscellaneous	10,000	
Interest on $500,000 @ 6%.....	30,000	
Total expenditure.....	$182,000	
Return from 250,000 trees:		
100,000 × 1¼ = 125,000 lbs.		
150,000 × ¾ = 112,500 lbs.		
237,500 lbs. @ $0.40.....		95,000
Profit on store		15,000
	110,000	$110,000
Cost for sixth year.....	$72,000	
SEVENTH YEAR.		
Tools, cattle, etc.....	$10,000	
Maintenance of land and building (5% of cost) which is $90,000	4,500	
Tapping	50,000	
Plant operation, boxing and shipping 387,500 lbs.....	30,000	
Superintendence and administration.....	25,000	
Miscellaneous	10,000	
Interest on $500,000 @ 6%.....	30,000	
Total expenditure	$159,500	
Returns from 250,000 trees:		
100,000 × 2 = 200,000 lbs.		
150,000 × 1¼ = 187,000 lbs.		
387,500 lbs. @ $0.40.....		$155,000
Profit from store.....		15,000
Total receipts		$170,000
Deduct expenditure		159,500
Credit balance (represents 2% on $500,000 capitalization)		$10,500
EIGHTH YEAR.		
Cost of up-keep and operation.....	$160,000	
Return from 250,000 trees:		
100,000 × 3 = 300,000 lbs.		
150,000 × 2 = 300,000 lbs.		
600,000 lbs. @ $0.40.....		$240,000
Profit from store		15,000
Total revenue		$255,000
Deduct expenditures		160,000
Credit balance (represents 20% on $500,000 capitalization)		$95,000
NINTH YEAR.		
Cost of up-keep and operations.....	$175,000	
Returns from 250,000 trees:		
100,000 × 3½ = 350,000 lbs.		
150,000 × 3 = 450,000 lbs.		
800,000 lbs. @ $0.40.....		$320,000
Profit from store.....		15,000
Total revenues		$335,000
Deduct expenditures		175,000
Credit balance (represent 30% on $500,000 capitalization)		$160,000
TENTH YEAR.		
Cost of up-keep and operation.....	$200,000	
Returns from 250,000 trees:		
100,000 × 4½ = 450,000 lbs.		
150,000 × 3½ = 525,000 lbs.		
975,000 lbs. @ $0.40.....		$390,000
Profit from store.....		15,000
Total revenues		$405,000
Deduct expenditures		200,000
Credit balance (represent 40% on $500,000 capitalization)		$205,000

CONCLUDING REMARKS.

The total estimated cost to develop a 1,000 hectares (2,500 acres) rubber plantation in the Philippines is $500,000 or $200 an acre. Such a plantation properly developed should average 500 tons to 635 tons (400 to 500 pounds an acre year) of crêpe rubber a year henceforth at a cost of from $0.20 to $0.30 a pound. This cost will make for a good profit until the peak is reached when the demand is exceeded by the production. It is then that the low production cost, wherever it may occur—it points to

Java and Sumatra now—will prevail unless Philippine production is protected by United States import taxes on foreign raw or finished raw commodities.

The end of 1918 showed over 400,000 commodities of rubber in different conditions, while the end of 1919 showed an increase to 500,000 commodities with new uses developing daily, as the rise in price of wood, iron and steel permit the rubber substitute at a lesser cost.

Because of the tremendous initial and carrying cost of development, rubber is primarily a development for a large industrial consumer. The small planter will never be a source of supply for this commodity like the cotton raiser, nor can it be produced on the popular sugar central basis.

The Philippine Government has under serious consideration the necessary law changes to permit large responsible industrials to operate. Understanding the present situation as outlined above, it is believed that capital with faith and courage in the Philippine Government may take the maximum land area allowed by present laws and develop, using Filipino labor, with an assurance that amended laws will soon permit this operation to expand on as favorable a business basis as now pertains to the rubber-producing Dutch Netherlands and British Colonies of the Far East.

TAPPERS—FRONT ROW, YAKANS, REAR, FILIPINOS.

A Layout of a Scientific Rubber Footwear Factory.

A COMPARISON of the plant lay-outs of the leading rubber footwear factories in this country reveals differences in plant arrangement which are easily explained. Many of these factories have been in operation for forty years or more, and frequent additions to meet the demands of increased production have assumed such proportions that the original lay-outs have been lost sight of entirely. There are cases, too, of exactly the reverse nature where in the centralization of certain classes of the product in separate plants, some factories for the time being find themselves utilizing more production space than efficient management would require.

SEQUENTIAL AND PARALLEL PROCESSES.

Rubber footwear manufacturing involves both sequential and parallel processes by which the raw material undergoes chemical and physical changes before it finally reaches the finished state. A light rubber, for example, has the following parts: upper, outsole, toe cap, heel foxing—known as the "gum work"; insole, lining, junior, cloth heel, joining strip, rough back, filler—grouped together, known as "inside work." The "gum work" and the "inside work" are prepared for making in parallel processes which are in themselves sequential. Thus the linings have to be coated, laid in tables of forty ply for cutting; cut, counted, cemented and joined before they reach the makers' table. Similarly the outsoles have to be calendered and cut before they are ready for making. It is necessary that all parts be prepared and ready for making before the shoe is assembled or made. After the assembly, the process becomes purely sequential, varnishing, curing, stripping, trimming, and packing being the final operations.

The use of conveyors, which have speeded up production in tire manufacturing, is not suited to the production of footwear on account of the number and tackiness of the small parts used. Thus we find the hand truck still largely used in footwear factories.

INTERDEPARTMENTAL BALANCE.

Balance between the departments is most important, and the first step toward balance is an adequate lay-out. The chain of operations is only as strong as the weakest unit. The arrow which points to the direction of the productive flow, then, must keep as nearly as possible to a continuous course. Operations must be grouped in departments according to their order, and the routing facilities must be adequate to keep the unfinished material in its continued progress through the plant.

Manufacturing can be classified, generally speaking, as either manufacturing to order or manufacturing to stock. Rubber shoes come under the latter class; that is, they are manufactured according to a stock design on orders or anticipated orders. This insures standard, permanent equipment and operations which are practically unaffected by changes in styles from year to year. Lasts change, but most factories have shops where they fashion their own, either of metal or wood. Metal lasts of aluminum have the advantage that they can be melted up and recast. Similarly, new styles call for changes in patterns and dies, but this is taken care of by the pattern department, a necessity in every shoe factory.

THE IDEAL BUILDING.

Owing to the large number and the comparatively skilled class of workers required for the industry, most of the plants are located in cities where land is at a premium. For this reason floor-space has increased in value and the tendency is toward high buildings. This simplifies the problem of expansion, however, as the addition of a night shift in the mill room can double the stock output, while the addition of another story to the making room will take care of the increased production.

The U-type of building, four stories high, has been chosen as best suited for manufacturing rubber footwear. The railroad siding runs parallel to the U, permitting the entrance of the raw materials at one end and the exit of the finished product at the other. The raw materials used are crude and reclaimed rubber, compounding ingredients, and cotton fabric.

STORAGE OF RAW MATERIALS.

Rubber should be stored in a cool, dry place such as is provided in the basement under the stores department A. Cotton cloth can be stored in room A, while compounding ingredients such as whiting, litharge, lithopone and sulphur are kept on the second floor H, adjacent to the compound room I, where they are kept in drying bins ready for use. Storage spaces M and R on the third and fourth floors are for a reserve supply of materials necessary in these times of uncertain markets and transportation.

POWER, HEAT AND LIGHT.

These are the next factors to be considered. A great many rubber shoe factories buy all their power, and unless the circumstances are exceptional it is generally cheaper to do so. It is assumed, therefore, that the electric power necessary to run the motors in the mill, calender, and cutting rooms is received from an outside source and reduced to the required voltage through transformers. Enough power to run the lighting plant can be made on the premises. Heating is by direct steam from the boilers located in room D, which also supply heat for the vulcanizers, mills, calenders, and heel presses. Machine shop E is placed between the arms of the U next to the boiler rooms and adjoining the mixing and calender rooms where the bulk of the heavy machinery is located.

COMPOUNDING.

We will now follow the productive arrow through the operations. First of all is the mixing of the compounds, which is done in a separate compartment B, next to the mill and calender room.

Despite the fact that compounds are no longer secrets in the fullest sense of the word, rubber manufacturers still closely guard their formulas. In one factory, known to the writer, the stocks are mixed in a separate building some distance from the mill room. In another, the mixing is done in the calender room with no pretext of secrecy. The sequence of operations calls for it being located next to the calender room, as is shown in the diagram. It is equipped with four 20 by 22 by 60-inch mixers, one washer, two 15-inch crackers, and two 40-inch refiners. The ingredients are weighed in the compound room T on the second floor and lowered to the mixers on a small lift or dummy elevator. The rubber is weighed out near the mills. Most manufacturers break down the rubber before mixing, and one of the mills can be reserved for this purpose entirely.

The mixing of rag stock made of fabric scrap, reclaimed rubber, and cheap fillers which is used exclusively in footwear for coating insoles and inside pieces where a stiff compound is required, forms an important part of the work of this department. There is considerable truth in the statement that the cheaper the stock the harder it is to manipulate successfully. In the plan here shown the scrap from the cutting room is fed into a bin by means of a chute from the second floor. Bins are also provided for gum scrap which is worked back in the freshly mixed batches in fixed percentages to insure uniform stock.

CEMENT, VARNISH AND SCRAP DEPARTMENTS.

The making of cement and varnish is done in two separate buildings apart from the main factory on account of the highly inflammable materials used. A scrap department is also located in an outside building.

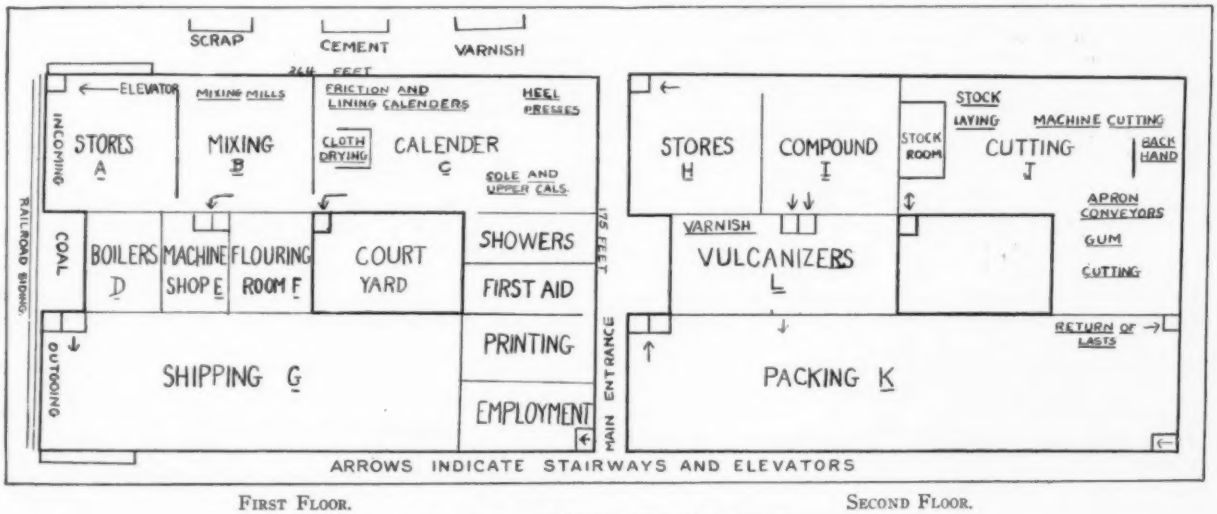
CALENDER ROOM.

In the calender room the work divides itself into three or four classes which call for grouping of machinery along these lines. The rolls of cloth are brought from the store room A to the cloth dryer in room C, where the moisture is removed before calendering. Three 4-roll calenders are provided for coating and frictioning cloth. This type is now generally used, the fourth roll insuring a more uniform gage in running the stocks. Each calender is provided with two mills for "warming up."

The heel department is equipped with a calender for laminating the stock, a beam cutting press for dieing out the blanks, three two-platen heel presses, one single platen press for molding fibre soles, and two heel trimming machines for removing the overflow. This semi-cured stock is returned to the mixing room, run through a refiner, and used again in fresh stock. The upper and outsole calenders complete the units in the department. For running uppers, two of the calenders are used for print uppers for gum shoes and a third for running plain sheet for boots and heavy all-rubber gaiters. Two outsole calenders complete the outfit.

MISCELLANEOUS PROVISIONS.

It will be noticed that all stock from these calenders is carried directly to the cutting room on conveyor belts. This prevents the soft upper stocks from being exposed to the necessarily dusty atmosphere of the calender room. The coated and frictioned stocks are carried to the cutting room on an elevator which is used exclusively for keeping material moving between departments. Lastly, but not the least important, we have the foreman's office centrally located, that each section of his department may be under his eye at all times. A wash room with shower baths for the use of the mixers is a necessity in all rubber factories where accelerators of a poisonous nature are used. The first aid room is located on the first floor with a separate entrance and easily accessible to all departments.



FIRST FLOOR. SECOND FLOOR.

LAY-OUT OF AN IDEAL FOOTWEAR FACTORY.

CUTTING ROOM.

The cutting room J is the next department in the sequence and is located on the second floor directly over the calender

room. Rolls of friction, net linings, rag fillers, and tennis duck are brought from the first floor on the elevator and placed in the stock room, which is equipped with bins open at both ends. This enables the fresh stock to be placed at one end, and the oldest can be easily removed from the other. The best results are obtained when the stock is aged at least a week, and this requires ample storage facilities.

Six tables are reserved for laying off stock for cutting, and a revolving drum for plying up nets, frictions, tennis, and fleeces is also employed. Rag and insoling and the heavier stocks which need to be coated with whiting between the plys to prevent their sticking together, are doubled off by hand. Twelve cutting machines, six of the double clicker type, and six beam presses are stationed next to the stock laying tables. An overhead motor with belt drive furnishes the power. An overhead track arrangement with a siding for each table can be used effectively for carrying the stock from the drum and tables to the machines.

The clicker machines are used on light work, such as insoles, tennis, fillers, and linings, and the beam presses for the heavier stocks. Large patterns, such as boot leg linings, and smaller ones where the demand does not justify the purchase of dies, are cut by back hand cutters for whom five tables are provided adjacent to the machines. The cut stock is laid out on the tables at the head of the machines where it can be easily checked by inspectors, placed on trucks, and carried to the preparatory department on the next floor.

The scrap cage is placed near the drum so that the weights of the tables of stock can be obtained as they are laid off. The scrap from the cutters is checked and weighed here before being taken to the compound room and deposited in the chute. In the center of the room the successive operations of cutting and assembling vamps, counters, and legs for boot teams are carried on. In the gum cutting section, the sole cutting is done by machine and hand, print upper cutting on the zinc plates, and die cutting on the wooden block. The space in the center of the room is reserved for stock. A bias machine cutter located next to the back-hand cutters cuts all the strips for binding the edges of shoes.

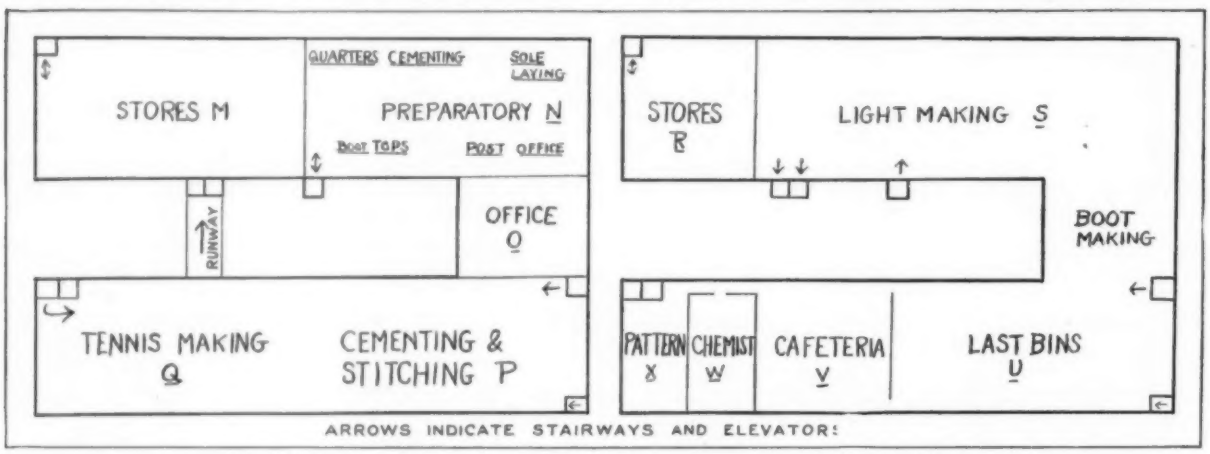
In the gum cutting section the sole and upper stocks are taken off the aprons on books, frames, reels, and shells with a liner between the stock.

PREPARATORY DEPARTMENT.

The next step in the progress of production takes place on the third floor where the preparatory department N is located directly over the cutting room. The grouping of operations here may seem to be a departure from the lay-outs of many footwear plants. But analysis of the processes will show that they are all related and can be well controlled and supervised under one separate department.

The post-office section or stock cage is where all the inside work for gum shoes, tennis, gaiters, and boots is counted into sets for the different makers. These pieces are then prepared and cemented for the makers, some by hand, and others, such as insoles, cemented on one side, and juniors, and fillers cemented on both sides, by machines which convey the pieces to belts for drying. The insoles are carried the length of the room on an overhead belt to the making room above, where they are picked off by boys and made up into sets. Other preparatory operations in this department are top making for storm king and hip boots, quarter making, and sole laying where the outsoles for boots, heel tennis and lumberman's are made up with the heel and form sole.

The preparatory department is a very important connecting link between the cutter and maker, and to be operated efficiently it must have space enough to take care of all operations. If it is cramped for space, or, as in one footwear plant, its sub-divisions are tucked away in odd corners of the shop, production cannot fail to be seriously hampered. Some means of ventilation must be provided here, too, for the obnoxious odors of stale naphtha make it difficult to obtain good help unless the air is kept fresh.



THIRD FLOOR. FOURTH FLOOR.

LAY-OUT OF AN IDEAL FOOTWEAR FACTORY.

EXECUTIVE AND SALES OFFICES.

No space is provided for executive or sales offices in this plant. Usually, when the factory is within a short distance of the market for the product, the sales and executive offices are located there. Many concerns also prefer to have the auditing, accounting, and bookkeeping done outside of the factory. However, if the circumstances made it advisable to locate these departments at the factory a separate building could very handily house them. The office space indicated in O is for production managers, planning and ticket offices, and the keeping of production and cost records.

TENNIS MAKING ROOM.

The other side of the U on the third floor is devoted to tennis making entirely. In division P the parts are assembled, cemented, seamed, stitched, eyeletted, and put up ready for making in room Q. The runway to the elevators provides a passage for unfinished material from the preparatory department and an exit for the finished shoes on their way to the vulcanizers. The flouring room on the first floor is fitted up with blowers to

remove the excessive dust. All white tennis shoes are sent there before curing and buffed with a coating of talc or whiting.

VULCANIZERS.

The vulcanizers are located in L between the two sides of the U, directly over the boilers and next to the elevators from the making rooms with a direct exit on the other side to the packing room. Both steam and dry-cure heaters with several automatic varnish dipping machines form the major part of the equipment of this room. Shoes are placed on racks in cars which operate on rails throughout the plant.

GUM SHOE, GAITER, AND BOOT MAKING ROOMS.

On the fourth floor, the making rooms for gum shoes, gaiters, and boots occupy the largest position of the space. Room S has a capacity of 15,000 pairs of light gum shoes and gaiters, and room T 1,000 pairs of boots, making the total capacity of the plant, including tennis, from 20,000 to 25,000 pairs per day. The benches in the making room are 4 by 25 feet and fitted up with racks for linings, juniors, uppers, and outsoles and partitions for lasts. The foreman's office is placed on a mezzanine floor over the insole table. The last bins U are located conveniently to the making room and are connected with the packing room by a lift, permitting easy and direct return of the lasts after stripping. The pattern room and laboratory find a place with the restaurant between them and the bins.

PACKING ROOM.

The packing room receives the shoes from the vulcanizers, trims off the linings, strips the shoes from the lasts, inspects and packs them in case lots. Shipping space is confined to one floor as everything is sent to the jobbing house as soon as made.

ELEVATORS.

It will be noticed that there are six elevators in this plant, no more than are actually needed. Time lost in the routing of material is just as costly as lost labor within the sphere of departments. The writer recalls one shoe factory where two elevators carry all the incoming stores, deliver all unfinished work, and take all the shoes to the heaters. The loss of time in waiting, the resulting confusion, and the terrific drawback to production from this condition made such an impression when shown up by a time-study man that steps were taken to relieve it immediately.

INTERDEPARTMENT LAYOUT.

This important consideration requires even more careful study than the location of the departments themselves. Sufficient space must be had for the operator of a machine to work speedily, for the unfinished material as soon as it is turned out, for the machinist to make repairs, and for the waste to be removed. Aisles must be wide enough to allow free passage for trucks. The source and location of artificial and natural lighting must be considered. Ventilation, too, is important and there can be too much as well as too little. An example of this is brought to mind where a certain operation in a shoe factory had an abnormally high labor turnover. Men rarely stayed longer than two weeks on this particular job. Investigation brought out that the table was stationed next to the elevators which were constantly being opened on both sides, making a draft and considerable dust. To add to these discomforts, a constant procession of trucks was continually crowding by and interrupting the work. This one bit of poor lay-out cost this company many thousands of dollars in labor turn-over and spoiled material before it was remedied. It is very easy to lay out the principal occupations in a department and then to crowd the rest in somewhere, but it is only storing up trouble for the future.

The cost of supervision and management depends somewhat on the plant lay-out. The accompanying rubber shoe factory could be well handled by twenty-three foremen, whereas one manufacturing less shoes than this one requires twenty-nine. Why? Simply on account of the lack of centralization of departments. But good lay-out is only a beginning for a successful enterprise. In the final analysis all the lay-outs in the world will amount to nothing if the "stuff"—the management by capable men—is not there.

RECENT IMPROVEMENTS IN TESTING MACHINES.

THE PENDULUM TYPE of testing machine has proved to be the most satisfactory form for use in rubber and fabric testing. By recommendation of Committee D13 of the American Society for Testing Materials it is destined to be adopted as standard. Certain improvements have been made during the past year in the well-known Scott machine. For testing tire cords a lighter capacity head has been developed in order that autographic records of these tests may be made. The illustration shows the machine equipped for this work, although arranged for fabric testing and not for cord.

COMBINATION FABRIC AND CORD TESTER.

A new testing head of 80 pounds capacity, graduated by fifths of pounds, is now available for use on rubber tests in light gages. This head has the short swing of the pendulum lever, the maximum reading of the machine being reached inside of the 36 degrees of swing of the pendulum. This machine with its recorder has also proved valuable for taking adhesion or friction tests, and for this work it is advisable to reduce the speed of the pulling jaw to one or two inches per minute. This can be done by means of special gearing which can be readily changed by the operator.

A transmission gear equipment capable of producing a wide variety of speeds has been perfected. As ordinarily built it is arranged to give speeds of the pulling jaw of the machine of one, two, six, 12 and 20 inches per minute. With a machine equipped with such a gear box, autographic recorder, and various styles of clamps, it is possible to do a wide range of testing on a large variety of materials. The recorder has been arranged to stop at the time of reverse of the machine, and is reset by the operator.

SPECIAL HEAD FOR LIGHT GAGE RUBBER TESTS.

The Venturi or capillary type of pen has proved the most satisfactory form. With suitable ink this pen is capable of giving long service at one filling and a dry record as soon as it can be removed from the machine.

Motor-Truck Efficiency as Related to Solid and Pneumatic Tires.

By S. V. Norton.[1]

THERE are two ways of viewing the problem of pneumatics on motor trucks. One is to consider it in the light of future changes and improvements in truck design which may become possible through the use of air tires, and the other is to look at it from the position of the present-day operator who wants to know whether he can safely avail himself of the advantages claimed for them. In the one case it is like throwing the spotlight on the theoretical side of truck design to see what it may be like ten or fifteen years from now. In the other it is like asking an experienced business man or a banker whether, by making certain investments, you can save or earn some money.

While future improvements in truck design are highly important, they are of perhaps more interest to the designing engineer than to the operator of a truck built for present-day service. Hence, I have sought information from sources which would throw light on the problem of whether trucks as built to-day should use solid or pneumatic tires. The results of a nation-wide canvass of truck manufacturers, truck salesmen, and operators as well as tire dealers and those on whose local service the truck depends are set forth in this article.

WHY PNEUMATICS ARE USED.

At present, the accepted field for pneumatics appears to be on trucks up to 1½ tons capacity, and that for solids on trucks of 3½ tons or over. Between these two capacities the choice should be made only after a careful study of the important factors involved in each case. In order to ascertain why pneumatics were used, I asked several hundred motor-truck and tire salesmen as well as truck operators throughout the United States to state what they considered was their chief advantage in this debatable field. The following reasons were given, with the percentage of replies for each:

Advantage.	Per cent.
Greater traction	40
More cushioning	28
Higher speed	21
Lower repair bills	5
Saving in gasoline	4
More work possible	2
	100

Other reasons were given for the use of pneumatic tires but they were thought to be of secondary importance. They were: less breakage of load, reduced fatigue of driver, less depreciation of truck, reduced depreciation of roads, adaptability of truck to farm use, lighter weight trucks possible, and increased earning power.

DEPENDABLE INFORMATION LACKING.

The replies to my questions show a surprising lack of dependable information, as the following quotations will indicate:

"This question is one that comes up very frequently," said a large Eastern city truck agent, "and a complete discussion of the merits of the two types would be advantageous to us."

A tire salesman who has made many inquiries writes, "Some operators who have kept fairly complete records on gas, oil, and repairs say they have nothing they consider convincing as to comparative savings effected by pneumatics."

An exceptionally well-informed publisher in Chicago says, "Operators of large size pneumatics haven't had them long enough to decide as to their relative value. Moreover, it is surprising to find how few operators keep accurate cost records."

A Seattle tire agent says, "Operators using pneumatics have been entirely sold from a theoretical standpoint due to the missionary work of the advertiser, with no analysis of conditions."

These remarks and many others of a similar nature indicate that a careful study should be made before deciding which type of tire should be used. The factors bearing on the problem may be divided into: (1) the engineering aspects involved; (2) the practical operating features encountered by the driver, and (3) the features of tire service in the community in which the truck is running.

OCCASIONS SOMETIMES ARISE WHEN TRUCK OVERLOADING IS UNAVOIDABLE. IN SUCH CASES, SOLID TIRES PROVE THEIR WORTH. THE TRUCK SHOWN ABOVE CARRIES 22,000 POUNDS OF STEEL BEAMS. THE LOAD WAS BROUGHT OVER BAD STRETCHES OF ROAD BETWEEN PITTSBURGH AND AKRON WITHOUT MISHAP.

In taking up the engineering aspects I speak frankly as a layman and not as a truck engineer.

DISADVANTAGES IN CHANGING TIRE EQUIPMENT.

Before changing tire equipment from solids to pneumatics the operator should realize that, in order to gain certain possible advantages, he must face other definite disadvantages. In the first place he will have to cut down the wheels of the truck, which will prove a considerable item of expense. Moreover, proper allowance must be made for both body and fender clearance. It should also be remembered that the larger sectional diameter of the pneumatic tires will affect the steering clearance, and that the truck will be unable to turn in as short a radius as it did on solid tires.

As the larger diameter of pneumatic tires will affect the gear reduction, if substituted for solids, the mechanical ability of the truck will be affected. If the change is made, will the truck be able to "make the grade?" Will it materially affect the payload capacity of the truck? Will it reduce the ability to operate trailers? What will the effect be on the engine?

The increased maximum speed due to the larger diameter of the pneumatic tires will be relatively slight provided the engine is governed to run at the same speed as formerly. If the change is made to get more speed out of the machine, the gear ratio must be reduced, which reduces the ability of the truck, or the governor must be opened and the engine speed increased. There is danger here, however, as speed induces extra vibration, joints begin to loosen, and before long the engine may be literally racked to pieces.

Additional speed calls for greater braking ability. Brakes designed for slower speeds but used under more severe circumstances will inevitably require more frequent renewal. The question for the truck owner to decide before making the change is whether the truck can be equipped with brakes having much larger capacity, and if not whether it will pay to take the chance.

Of no less moment than the features mentioned above, so far as the dependability of the truck is concerned, is the question of air supply. Since pneumatic tires require from 90 to 160 pounds

[1] The B. F. Goodrich Rubber Company, Akron, Ohio.

inflation pressure, hand pumping is out of the question and a power-driven pump on the truck or close at hand becomes a necessity. In many cases this is not practicable.

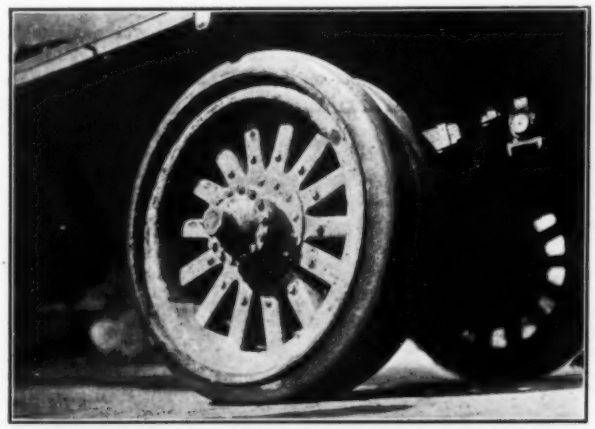
TRUCK MANUFACTURERS' OPINION IMPORTANT.

While these mechanical considerations apply particularly to using pneumatics on trucks now in operation on solid tires, most of the same problems are involved in changing the equipment on trucks manufactured but unsold. The truck buyer should satisfy himself that his agent's counsel on the equipment is based on positive facts and endorsed by the manufacturer. Otherwise he may expect more or less disappointment and dissatisfaction over the performance of his truck if he orders the equipment changed to pneumatics before delivery.

To sum up, since so many important technical features are involved, the operator or prospective buyer would do well to seek the advice of the manufacturer of his truck before changing the equipment. No one else knows so well the probable effect on various parts nor can advise more intelligently as to the probable loss or saving such a move would entail on the mechanism of his truck.

TRUCK EFFICIENCY DEPENDS ON SAVING TIME AND MONEY.

Let us now look at the practical operating features that must be considered in determining which type of tire will make the truck most efficient in service. Broadly speaking, the efficiency of a truck in performing its function depends upon the amount of time or money, or both, that is saved for the shipper, as compared with any other means of haulage. While it is difficult to separate all the factors bearing on these two items, they may be roughly classified as follows:



SOLID TIRES ARE INDISPENSABLE IF DELIVERY OF THE LOAD MUST REACH ITS DESTINATION WITHOUT FAIL AT TIME PROMISED; IF REGULAR DELIVERY IS MORE IMPORTANT THAN EITHER SPEED OR COST OF DELIVERY, OR IF THE CAR CARRIES OVERLOADS BEYOND THE RATED CAPACITY OF THE TIRES.

The factors affecting time are: Distance of hauls; traffic congestion; speed of delivery; regularity of delivery; condition of roads (effect on speed of truck); number of trips per day; and time out for repairs, etc.

The factors affecting money are: Amount of pay load and overload; condition of roads (effect on tires and truck); number of trips per day; cost of operation; cost of up-keep, and cost of substitute equipment.

In what way does the tire equipment bear on these factors?

THE EFFECT OF PNEUMATICS ON TIME FACTORS.

Let us see how pneumatic tires may affect the time factors. If the operator is engaged in long-distance hauling with relatively few stops, pneumatic tires will almost invariably save running time, due to the fact that they absorb the road shocks so much more easily than solids. It should also be noted that the driver's fatigue in such cases is far less on pneumatics than on solids. Up to the present, however, comparatively few trucks are engaged in long-distance hauling. The great majority of trucks operate in cities where they cannot possibly obtain a speed of over ten miles an hour. For such speeds there can be no possible saving in time which would offset the extra cost of running on pneumatic tires.

The condition of road surface has a very important bearing on the time element, as it has a direct effect on the speed of the truck. In fact, under certain circumstances the increased traction afforded by the heavy duty pneumatic makes it possible to operate the truck while if it is equipped with solids it cannot be driven at all. This is particularly noticeable in rural districts where there are no hard-surfaced roads. One of the advantages frequently mentioned is the greater number of trips per day which may be obtained from a truck equipped with pneumatics. So far as this factor by itself is concerned, there is no doubt that the advantage is in favor of pneumatics.

There is one more important factor to be considered as affecting the time element, and that is the number of hours the truck is laid up for repair. Barring occasional lay-ups caused by defective material or workmanship, solid tires can be depended upon to give uninterrupted service from the time they are applied until worn down to the point. They can then be replaced without serious loss of time. Owing to the comparative vulnerability of pneumatic tires, they are far more likely to require time out for repairs and replacements. Punctures do not seem to be so frequent or so costly in point of time as blow-outs due to cutting and chafing of side walls from ruts, as well as to under-inflation and overloading.

When we come to compare the time out for causes other than tire trouble, we find a variety of conflicting claims, though it seems to me the evidence favors the use of pneumatics. It is claimed by some that the use of pneumatic tires accelerates the wear on certain parts, such as bearings, bushings and steering knuckles, and that a correspondingly greater amount of time is required for the adjustment and renewal. Moreover, many owners state that the use of pneumatics on trucks causes their drivers to overspeed and take more dangerous chances that result in accidents and time out for otherwise unnecessary repairs than is the case on solids.

THE QUESTION OF PAY LOAD.

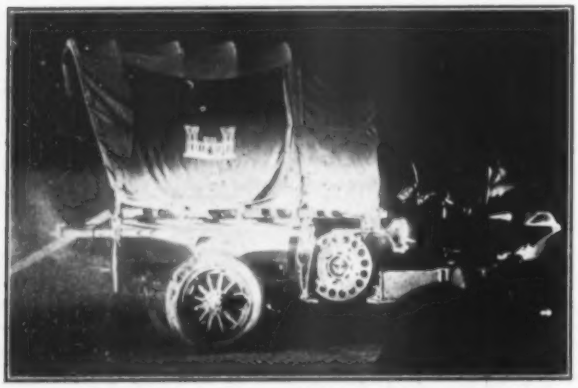
The amount of work a truck can perform and hence the saving or profit it will show depends largely upon the amount it can carry; in other words, its pay load. There is a well-nigh universal tendency to overload trucks beyond their rated capacity and it is not uncommon to find trucks carrying twice their rated capacity. When it comes to standing up under this usage, there seems to be no doubt that solid tires will not only carry heavier overloads, but will last longer in such service. This seems to me the most important and least understood factor in the entire list. Apparent savings may be offset or overbalanced by the additional trips that become necessary when an overload cannot be carried.

Closely allied to the cost of overloading pneumatic tires is that of underinflation. The constant and extreme flexing caused by overloading has a tendency to weaken the side wall, making it much more likely to fail in service. While solid tires are not invulnerable they can stand more abuse and are less expensive to maintain in working condition. In addition to the likelihood of incurring expense from overloading and underinflation, there is the danger of ruining pneumatic tires from running them after being punctured or blown out. It is not uncommon for practically new tires to be ruined by drivers who do not stop their trucks as soon as they begin to suspect tire trouble.

In attempting to collect data as to mileage on pneumatics, I found many varying claims, ranging from 200 miles under adverse conditions to 25,000 miles on lighter trucks, over good roads with proper care. With rare exceptions the mileage delivered by solid tires is considerably greater than that from pneumatics in the same class of service. When the earning capacity of the truck

concerned is judged by the number of trips per day, the advantage seems to lie with pneumatic equipment, provided the runs are long enough and not restricted by such factors as traffic congestion and delays at terminals.

As I suggested before, there are certain conditions under which trucks on pneumatics can make trips when those on solids cannot be operated. Hence, their earning capacity is just so much greater. It has been noted that trucks on pneumatics not only negotiate the unpaved roadways more easily but do less damage



PNEUMATIC TIRES ARE USED BY THE ENGINEERING CORPS OF THE WAR DEPARTMENT ON TRUCKS WHICH CARRY THE HUGE SEARCHLIGHTS USED TO SPOT ENEMY AIRCRAFT. THE DELICATE MECHANISM OF THE SEARCHLIGHTS MAKES NECESSARY THE GREATEST POSSIBLE PROTECTION FROM ROAD SHOCK.

than those on solids, and hence are looked upon with more favor by the farmers they serve.

RELATIVE EFFECTS ON OPERATION COSTS.

When we come to consider the relative effects of solids and pneumatics on the cost of operation and up-keep we find a wide variety of opinions, but very few conclusions based on accurate cost records.

Let us examine briefly the items which should be included in such costs, and see how they are affected by solid and pneumatic tires. The following items are usually not affected by tire equipment: interest on investment; insurance; taxes and license; garage; supervision; wages of drivers and wages of helper. The following, however, may vary according to the type of tires used: depreciation; gasoline; oil; tires; repairs due to wear and tear and accident.

Taking them up in the order given, there are, so far as I know, no dependable figures covering depreciation on which to make comparisons, as no trucks have been run long enough on pneumatics to determine their effect on the ultimate life of the truck. As to the relative consumption of gasoline and oil, very few reliable figures are available, but the best-informed operators are inclined to feel there is little if any saving in these items, particularly on short hauls. On long hauls, however, the advantage seems to lie in favor of pneumatics.

When it comes to tires there is no question. The cost of pneumatics averages from two to three times that of solids. This is due to the higher initial cost of the equipment and the spare tires, their greater susceptibility to abuse and accident, and their lower average mileage.

So far as the cost of repairs to the truck is concerned, comparative data of a reliable nature cannot be obtained. The evidence indicates, however, that, except for the engine, the cost of repairs will be considerably less on pneumatics than on solids, due to the reduced vibration. And if the engine is not run at excessively high speed or continually overworked it will prove less subject to damage on pneumatics.

Summing up the factors affecting the saving of time and money, I have come to the conclusion that no general claims in favor of pneumatic equipment on trucks as a whole coming in the debatable field can be substantiated, and that the work to be done by each specific installation must be analyzed carefully before either type of tires can be safely considered the more economical.

THE QUESTION OF SERVICE.

Having reviewed the engineering features and the practical operating features, let us now see what the operator faces in so far as tire service is concerned. As the nature and extent of service of the maintenance and renewal of solid tires are well known, it seems unnecessary to comment on them except to say that years of study and competition have developed this end of the business to a high degree of perfection, so that the operator can depend upon many well-equipped service stations for instant attention, either in the day or night.

The manufacture of heavy-duty pneumatic tires of six-inch section and larger, is, however, a relatively new development. Less than a third of the manufacturers of passenger-car tires have started actively to make heavy-duty pneumatic truck tires, for they realize that the job of building a tire which will stand up under the use and abuse to which it is subjected nowadays is not easy. Moreover, the task is not finished when the tire comes out of the heater. It must be sold to the dealer, who, in turn, must not only stand behind the tire, but place himself in position to give the truck operator service. This means he must install a high-pressure air-pump, repair material and molds for vulcanizing and in most cases a service car for emergency calls, as it must be remembered the tire is apt to fall away from its base and it cannot be driven home flat.

It may be said, without fear of contradiction, that the tire companies themselves are not as yet prepared to give really efficient service in all parts of the country. In fact, even in the principal cities this phase of the business has not been fully developed. In the smaller towns there are almost no air tanks or pumps to keep tires properly inflated. Pumps on trucks themselves are reported as not always dependable, sometimes requiring from 15 minutes to half an hour to secure the desired pressure in a tire.

PNEUMATIC TIRES ARE IMPERATIVE UNDER SOME COMBINATION OF THE FOLLOWING FACTORS: TRACTION ON ANY KIND OF ROAD SURFACE, OR OFF THE ROAD, WITH COST SUBORDINATED; SPEED WITH COST SUBORDINATED, OR WHEN PROTECTION OF MERCHANDISE FROM ROAD SHOCK IS ESSENTIAL.

PNEUMATICS DIFFICULT TO REPAIR.

By far the most serious and difficult phase of giving service with heavy-duty pneumatics, and that which causes the most concern to truck operators, is connected with the repair. In fact, the chief complaint in regard to pneumatic truck tires, aside from their high initial cost, is that they are subject to injuries, cuts and damage generally of such a nature that they cannot be repaired except at the factory where they are made, or in a few cities at a factory branch, and often they are damaged beyond all repair. This is not only expensive, but frequently necessitates the purchase of more than one set of spares should the first set be injured while the others are being re-

paired. Oftentimes the principal cost of punctures or blow-outs is due to the necessity of laying up trucks awaiting new tires, due to stock shortage, or sending the damaged tires to the nearest factory branch for repair. Moreover, repaired casings frequently deliver but small mileage due to the overcure of the joined portions. This danger is most difficult to overcome in the large sections due to the longer cure required to vulcanize the interior portions of the new part of the casing. No doubt this feature will ultimately be corrected. The tread seems to give less trouble than the side walls which are more susceptible to rut wear and overloading abuse.

FIELD OF USEFULNESS CLASSIFIED.

The field of each type of tire may be separated into three classifications within which the operator may reasonably place his installation, and select his equipment accordingly. These may be called: (1) The imperative field; (2) the economic field; and (3) the optional field.

The factors that would bring a truck within the "imperative" field for solid tires are: reasonably hard road surface, dependability of delivery, regularity of delivery, and heavy loads with frequent overloads.

If delivery must positively reach its destination without fail at time promised; if regular delivery is a more important factor than either speed or cost of delivery, or if it carries overloads beyond the rated capacity of the tires, solid tires should be used.

Similarly, the factors that would bring a truck within the "imperative" field for pneumatics are some combination of the following: traction on any kind of road surface, or off the road, with cost subordinated; speed with cost subordinated, or protection of merchandise from road shocks.

The factors that would bring a truck within the "economic" field for solid tires are: short hauls in cities where speed is relatively unimportant; heavy loads with tendency to overloads; traffic congestion which reduces average speed; loading and unloading delays and need for low delivery cost.

Similarly those that would bring the truck within the "economic" field for pneumatic tires are: road conditions which will not prematurely destroy the tires; long hauls; high average speed; relatively light loads with no overloads; tire service conditions good and low cost subordinated to quick service.

In analyzing the "economic" field the operator must decide first whether he can avail himself of the potential speed pneumatic tires would give him. This, of course, includes the possible delays he may encounter due to tire trouble as a result of bad road conditions and those he will find, provided the tire service conditions in his locality cannot be depended upon. Next he must be sure that the features of his service provided by pneumatics will justify their extra cost.

The distinction between "economic" and "optional" fields is difficult to make. In fact, the decision as to which is the better equipment may be purely a matter of personal opinion, without strong factors on either side. Hence, I shall not attempt to define them. One of the most interesting significant developments which I have noticed in studying this subject, however, is the growing tendency among truck operators to use pneumatic tires on front wheels where the need for protection from vibration is the greatest, and solids on the rear to carry the burden of the load. This practice has much to commend it, and should steadily grow in favor.

CONCLUSION.

The movement toward the use of pneumatics should not be condemned, however, for undoubtedly it will be the means of increasing the scope of usefulness of motor transportation. The question is too new to be decided theoretically or from such meager records as are now available.

In concluding, I should like to urge that designing engineers study to develop such cushioning effects as may be possible through other means than tires, such as cushion wheels, improved springs, shock absorbers, etc. While I realize that no mechanical device is as resilient as air, we have a long way to go before we overcome the difficulties of making it serve us acceptably in puncture and fool-proof rubber tires, although the industry is making notable progress in this direction.

TWENTY-FIVE STORY OFFICE BUILDING FOR FISK RUBBER CO.

The new Fisk Rubber Company Building will be on the south side of Fifty-seventh street, New York City, running from Broadway to Eighth avenue, the site now occupied by the

THE FISK RUBBER COMPANY BUILDING.

Rutland and St. Augustine apartment houses. It will be twenty-five stories high, five stories higher than any other building north of Times Square. The front will be of brick and limestone, with rows of marble columns from the fifteenth to the twentieth floors, which are set in, giving a tower effect. The first floor, which will be 21 feet high, will be used as automobile showrooms. The Fisk company will pay a net annual rental of $600,000.

The land and building for the Fisk structure will cost $7,050,000. The corporation owning it is called the 1767 Broadway Company, of which H. T. Dunn, who is head of The Fisk Rubber Co., is president, and includes among its stockholders, besides The Fisk Rubber Co., the Willys-Overland Co. and the Willys Corporation.

The building will stand out prominently in the heart of the automobile district, as the industry promises to monopolize Columbus Circle before long. Close at hand are the salesrooms of the Chevrolet Co., the Kelly-Springfield Tire Co. and the Ford Motor Co.

NOSTIX COMPOUND.

Nostix compound, it is claimed, will prevent retread or sectional repairs from sticking in the molds. It is a blue-gray powder that is mixed with high test gasoline and applied with a brush to the old gum of retreads, sectional repair side walls and cold bead plates. After the cure it is brushed or washed off, leaving an azurine finish. (The Siek Manufacturing Co., Carmi, Illinois.)

Rubber Tariffs of Asia, Oceania, and Africa.

THE VALUE of the exports of manufactured rubber goods from the United States to Asiatic countries in 1919 was almost exactly double what it was in 1918, the bulk of the increase being in automobile tires and rubber shoes; the figures are $5,222,693 for 1919 and $2,675,636 for 1918. The largest customer, as usual, was Japan, which more than doubled its purchases, taking $1,469,076 worth of American wares, against $692,828 the year before, folowed by the Dutch East Indies and British India with over $800,000 each, and the Straits Settlements with over $700,000. Japan bought more than three times as many tires, $425,432 against $118,685, and nearly six times the number of shoes, 393,679 pairs instead of 67,330; the quantity of miscellaneous rubber goods was more than doubled, $276,280 instead of $129,559. Siberia is opening up again after being closed to commerce; it took $558,025 worth of goods last year and only $12,097 in 1918. Tires accounted for $266,674 of this, and rubber shoes for $204,823. China's quota was over two and one-half times that of 1918, $557,391 against $197,342; of this, $254,784 was for tires. The tire demands of British India ($557,396), of the Straits Settlements ($636,101), and of the Dutch East Indies ($686,873) were also large increases and formed the greater part of their importations of American rubber goods.

In Oceania the increase of exports was slight, being $5,158,885 in 1919 and $4,875,147 in 1918. A falling off of over half a million in Australia was made up by increases in New Zealand and the Philippines. Australia and New Zealand each took over $1,300,000 worth of American rubber goods, and the Philippines $2,300,000. Preferential tariffs in the British colonies, strongly favoring goods from Great Britain, have been put in force in each. Imports of tires in Australia fell from $1,144,405 in 1918 to $751,584 in 1919, while in New Zealand they rose to $1,023,807 from $950,985; in the Philippines the imports of tires were $1,372,544 against $982,224 the year before. There was a marked diminution of more than half in belting for Australia, while rubber shoes and druggists' supplies increased. In New Zealand the increase in belting and rubber boots was marked. With the British absorption of German Oceania and the elimination of the Philippines, the Oceanian statistics will refer almost exclusively to British possessions.

Exports to Africa rose in 1919 to $1,676,014 from $1,391,530 in 1918, over three quarters, $1,294,798 worth, going to British South Africa, which seems to have become a steady and permanent customer for American goods. It took automobile tires to the amount of $479,934, as against $591,378 in 1918; belting worth $564,972, instead of $472,235, and miscellaneous rubber goods to the amount of $136,183, instead of $75,435. British West Africa took $122,940 worth of tires as compared with $43,948 in 1918. It may be noted that British East Africa took $32,000, French Africa $28,000 and Portuguese Africa $25,000 of American tires in 1919. Belting to the amount of $70,000 to the Belgian Congo seems to be an isolated case, but the $50,000 of belting that went to Portuguese Africa follows on $64,000 sent the year before.

The succeeding extracts from the tariffs of the principal countries of Europe show the competition to which rubber manufacturers of the United States are subject under existing tariff conditions. Owing to frequent tariff changes the figures and information given below should be periodically verified and small trial shipments made to test the rates.

UNITED STATES EXPORTS OF RUBBER GOODS TO ASIA, OCEANIA AND AFRICA.

Calendar Years 1918 and 1919.

EXPORTED TO—	Belting, Hose and Packing.	Boots.		Shoes.		Druggists' Rubber Sundries	Tires.		All Other Manufactures of Rubber.	Total
ASIA:	Value.	Pairs.	Value.	Pairs.	Value.	Value.	Automobile. Value.	All Other. Value.	Value.	Values.
Aden	.....	.....	.....	.....	.....	.....	$1,847	.....	.....	$1,847
China	$83,330	315	$888	98,031	$106,099	$21,418	254,784	$8,618	$82,224	557,361
Japanese China	574	808	1,697	8,797	10,192	252	1,425	.....	8,924	23,064
Chosen	2,704	48	304	1,394	1,218	162	11,538	150	3,879	19,955
British India	88,374	4	16	8,255	6,429	18,724	557,396	23,154	108,427	802,520
Straits Settlements	13,437	12	30	2,413	2,596	2,693	636,101	14,858	64,652	734,367
Other British East India	4,380	.....	.....	320	163	322	18,477	.....	1,857	25,199
Dutch East Indies	36,466	3	18	1,974	2,735	4,096	686,873	40,335	65,570	836,093
French East Indies	16,806	.....	.....	24	15	167	7,518	305	483	25,294
Hongkong	12,684	373	1,089	8,192	7,424	2,656	79,334	2,204	12,641	118,032
Japan	301,792	28,517	56,022	393,679	390,663	16,779	422,432	5,108	276,280	1,469,076
Persia	.....	.....	.....	.....	.....	.....	1,092	.....	.....	1,092
Russia in Asia	36,272	6,165	21,860	162,340	204,823	11,064	266,674	.....	17,332	558,025
Siam	1,830	.....	.....	234	281	842	12,239	505	2,487	18,184
Turkey in Asia	1,016	223	669	13,981	16,492	81	12,734	.....	1,592	32,584
TOTALS, ASIA, 1919	$599,665	36,468	$82,593	699,634	$749,130	$79,256	$2,970,464	$95,237	$646,348	$5,222,693
TOTALS, ASIA, 1918	553,323	5,012	13,408	85,306	79,904	46,874	1,624,319	50,814	306,994	2,675,636
OCEANIA:										
Australia	$199,101	1,773	$5,478	151,673	$99,477	$54,071	$751,584	$32,469	$199,569	$1,341,749
New Zealand	123,653	14,734	41,609	15,272	17,549	17,067	1,023,807	29,637	124,917	1,378,239
Other British Oceania	1,297	.....	.....	753	1,329	295	7,118	282	987	11,308
French Oceania	2,974	.....	.....	1,336	1,558	52	13,516	3,733	2,857	24,690
German Oceania	29	11	33	241	334	.....	8,862	546	2,718	12,522
Philippine Islands	279,282	1,319	2,878	153,305	146,311	26,273	1,372,544	125,522	437,567	2,390,377
TOTALS, OCEANIA, 1919	$606,336	17,837	$49,998	322,580	$266,558	$97,758	$3,177,431	$192,189	$768,615	$5,158,885
TOTALS, OCEANIA, 1918	704,806	9,489	27,896	280,001	214,644	60,760	3,112,503	177,710	576,828	4,875,147
AFRICA:										
Belgian Kongo	$70,467	.....	.....	4	$5	.....	.....	.....	.....	$70,472
British West Africa	10,335	2	$13	71	148	$282	$122,940	$268	$1,747	135,733
British South Africa	564,972	3,969	12,385	67,377	54,368	19,019	479,934	27,937	136,183	1,294,798
British East Africa	21	.....	.....	372	230	42	32,402	.....	1,835	34,530
Canary Islands	.....	.....	.....	.....	.....	.....	4,545	7	.....	4,552
French Africa	5,767	1	3	.....	.....	.....	28,821	132	596	35,319
German Africa	.....	.....	.....	.....	.....	5	.....	.....	12	17
Italian Africa	2,579	.....	.....	.....	.....	.....	.....	.....	.....	2,579
Liberia	.....	.....	.....	8	20	21	45	.....	4	90
Morocco	904	.....	.....	300	255	.....	225	.....	.....	1,384
Portuguese Africa	50,791	184	823	32	101	463	150	405	2,772	55,505
Egypt	3,143	.....	.....	1,043	911	219	25,881	2,999	7,882	41,035
TOTALS, AFRICA, 1919	$708,979	4,156	$13,224	69,207	$56,038	$20,051	$694,943	$31,748	$151,031	$1,676,014
TOTALS, AFRICA, 1918	543,568	3,341	12,356	118,880	76,841	7,610	644,355	28,122	78,678	1,391,530

(Compiled by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.)

Asia.

BRITISH INDIA.

Equivalents.—Rupee (16 annas), 32 cents; 1 anna (12 pies), 2 cents; Maund, 82 2/7 pounds.

Tariff No.		Tariff Valuation. Rs. a.	Duty. Per Cent.
77.	All kinds of belting	*Ad valorem*	2½
114.	All kinds of packing	*Ad valorem*	7½
121.	Tires and tubes and other manufactures of rubber not otherwise specified	*Ad valorem*	7½

CEYLON.

Equivalents.—Rupee, nominally 32 cents.

Crude rubber is exempt from import duty, but there is an export duty of 7.50 rupees per 100 pounds of rubber.

CHINA.

Equivalents.—Haikwan tael, 48.625 cents; picul, 133⅓ pounds.

	Tariff Unit and Duty.
India rubber and gutta percha, crude, *picul*	3.140
Boots, *pair*	0.080
Shoes, *pair*	0.020
Waste, *picul*	0.250
All other articles of rubber, *ad valorem*	5%

DUTCH EAST INDIES.

The governments of West Coast of Sumatra, Celebes and dependencies; residencies Tapanoeli, Benkoelen, districts Lampong, Palembang, Djambi, Banca and dependencies; West Division of Borneo, Menado, Amboina, Ternate and dependencies; Timar and dependencies, and Billiton levy an export duty of 5 per cent ad valorem on rubber, gutta percha, and other gums.

The tariff for South and East Borneo is 8 per cent ad valorem on rubber, gutta percha and other gums.

The tariff for East Coast Sumatra, Indragiri division, Kateman territory, Riau, Danei, is 5 per cent ad valorem on rubber, gutta percha and other gums. For the Singkel division of Atjeh this is also 5 per cent, for Tamiong 8 per cent, for Grand Atjeh and other portions of Atjeh except Waay Island, 10 per cent ad valorem.

Exemption from duty (Dutch East Indies) is granted for plantation rubber and gutta percha, provided that the exemption be warranted by a certificate issued by a European official in charge of the administration.

On automobiles and accessories imported into the Dutch East Indies a duty of 10 per cent ad valorem is levied.

FEDERATED MALAY STATES.

Equivalents.—Dollar, about 56 cents; picul, 133⅓ pounds.

Import Duties.	Duty. Dollars.
Motors, cycles and accessories, *ad val.*	10%
Export Duties.	
Gutta percha, cultivated, *ad val.*	2½%
Jelutong, *per picul*	0.50
Rubber—Any cultivated rubber. When the value of the highest grade is	
1*s.* 6*d.* per lb., *per picul*	0.27
Over 1*s.* 6*d.* ..... under 1*s.* 6½*d.* per lb., *per picul*	0.40
Over 1*s.* 6½*d.* ..... under 1*s.* 7*d.* per lb., *per picul*	0.53
Over 1*s.* 7*d.* ..... under 1*s.* 7½*d.* per lb., *per picul*	0.67
Over 1*s.* 7½*d.* ..... under 1*s.* 8*d.* per lb., *per picul*	0.80
Over 1*s.* 8*d.* ..... under 1*s.* 8½*d.* per lb., *per picul*	0.93
Over 1*s.* 8½*d.* ..... under 1*s.* 9*d.* per lb., *per picul*	1.07
Over 1*s.* 9*d.* ..... under 1*s.* 9½*d.* per lb., *per picul*	1.20
Over 1*s.* 9½*d.* ..... under 1*s.* 10*d.* per lb., *per picul*	1.33
Over 1*s.* 10*d.* ..... under 1*s.* 10½*d.* per lb., *per picul*	1.47
Over 1*s.* 10½*d.* ..... under 1*s.* 11*d.* per lb., *per picul*	1.60
Over 1*s.* 11*d.* ..... under 1*s.* 11½*d.* per lb., *per picul*	1.87
Over 1*s.* 11½*d.* ..... under 2*s.* 0*d.* per lb., *per picul*	2.13
Over 2*s.* 0*d.*, *ad val.*	2½%
Latex: a gallon of latex being taken as equivalent to 1 pound of cultivated rubber of the best quality, *ad val.*	2½%

PROTECTED MALAY STATES.

KEDAH: Export duty.
Rubber (wild), *ad val.* 15%
Rubber (plantation), *ad val.* 2½%

PERLIS:
Rubber, *ad val.* 2½%

KELANTAN:
Import duty.
Rubber seeds, Free.

JAPAN.

Equivalents.—Yen, about 49 cents; kin, 1.32277 pounds.

Tariff No.		General Tariff, Yen.
	CRUDE RUBBER, ETC.	
143.	Crude rubber, gutta percha, and substitutes thereof	Free.
	PASTES, ETC.	
629.	1. Rubber solution, including receptacle, 100 *kin*	18.10
	2. Rubber paste, reclaimed rubber and other unvulcanized rubber, *ad valorem*	20%
	BELTING, HOSE AND PACKING.	
629.	4. (A-4) Tubes:	
	(a) Armored with metal, inside or out, 100 *kin*	15.30
	(b) Other:	
	(b-1) Combined with tissues, yarns, cord, metal, 100 *kin*	13.80
	(b-2) Other, 100 *kin*	93.20
	A-5 Belts, 100 *kin*	22.20
	BOOTS AND SHOES.	
355.	1. Boots:	
	B. Rubber, 100 *kin*	50.00
	4. Overshoes of rubber, 100 *kin*	51.60
	OTHER GOODS.	
319.	Waterproof tissues, coated or inserted with rubber:	
	1. Wholly or partly of silk, *ad valorem*	40%
320.	Elastic webbing, cords, braids, etc.	
	1. Over 8 centimeters wide:	
	A. Partly silk, 100 *kin*	148.00
	B. Other, 100 *kin*	86.00
	2. Other:	
	A. Woven:	
	(a) Partly of silk, *ad valorem*	40%
	(b) Other, *ad valorem*	30%
	B. Other:	
	(a) Partly of silk, *ad valorem*	40%
	(b) Other, *ad valorem*	30%
486.	Insulated wires:	
	1. Armored with metals:	
	A. Submarine telegraphic or telephonic cables	Free
	B. Other:	
	(a) Combined with rubber or gutta percha, 100 *kin*	11.00
	2. Other:	
	B. (a) Combined with rubber or gutta percha, 100 *kin*	14.50
629.	3. Dental rubber, 100 *kin*	75.80
	4. Other:	
	(A) Soft:	
	(A-1) In lumps, *ad valorem*	20%
	(A-2) Rods and cards:	
	(a) Combined with metal, tissues, yarns, cords, fibers, 100 *kin*	8.65
	(b) Other, *ad valorem*	20%
	(A-3) Plates and sheets:	
	(a) Combined with metal, tissues, yarns, cords, fibers, 100 *kin*	7.40
	(b) Other:	
	(b-1) Not over 1 millimeter thick, 100 *kin*	95.60
	(b-2) Other	50.30
	(A-6) Threads, strips, bands, washers:	
	(a) Combined with metal, tissues, yarns, cords, fibers, 100 *kin*	15.30
	(b) Other, 100 *kin*	55.60
	(A-7) Erasers, 100 *kin*	24.90
	(A-8) Water bottles, 100 *kin*	48.50
	(A-9) Nipples (including inner wrappings), 100 *kin*	132.00
	(A-10) Mats and matting, *ad valorem*	30%
	(A-11) Other, *ad valorem*	40%
	B. Other:	
	(B-1) In lumps, bars or rods, plates, sheets, 100 *kin*	35.40
	(B-2) Tubes, 100 *kin*	38.90
	(B-3) Rings and washers, 100 *kin*	43.70
	(B-4) Combs (including inner packings), 100 *kin*	157.00
	(B-5) Other, *ad valorem*	40%
630.	Waste	Free

KOREA.

Rubber, manufactured or not, is subject to a duty of 8 per cent.

PERSIA.

Equivalents.—The toman = 10 krans = 20 shahis, about 96 cents; batman, 6.54 pounds.

		Duties. t.	k.	s.
13.	1. Rubber and manufactures thereof:			
	(a) Raw rubber, *batman*	0	0	8
	(a) Rubber in plates, sheets, or threads, *batman*	0	3	0
	(c) Goloshes and other rubber footwear, *dozen pairs*	0	6	0
	(d) Oilcloth of all kinds, *batman*	0	2	0
	(e) All other manufactures of rubber, not elsewhere specified, *batman*	1	0	0
21.	2. Toys of every description, *ad val.*	15%		

Oceania.

AUSTRALIA.

Equivalents.—Pound, sterling, $4.86 (normal).

Tariff No.		Tariff on British Goods. £ *s. d.*	General Tariff. £ *s. d.*
	CRUDE RUBBER, ETC.		
331.	(a) Crude rubber; waste; hard rubber sheets; rubber thread; boot and apparel elastics; masticated rubber, *ad val.*	Free.	10%
	(b) Rubber, powdered or reclaimed, *ad val.*	10%	15%
	BELTING, HOSE AND PACKING.		
326.	Rubber, or composition belting, *ad val.*	25%	30%
374.	(b) Asbestos and rubber packings, *ad val.*	20%	25%
332.	(b) Rubber and other hose, *ad val.*	25%	35%
	BOOTS AND SHOES.		
328.	Goloshes, rubbers and boots and shoes, and plimsolls (sneakers), *ad val.*	25%	30%
330.	Gum and wading boots, rubber, *ad val.*	Free.	10%
	TIRES, ETC.		
333.	(a) Pneumatic rubber tires and tubes, valved or not, including tire fillers, cut to size:		
	(1) Covers weighing each 2½ lbs. or less; tubes weighing each 1 lb. or less, *ad val.*	25%	35%
	(2) Covers weighing each over 2½ lbs.; tubes weighing each over 1 lb., *per lb.*	0.1.6	0.2.0
	ad val.	25%	35%
	Whichever rate returns the higher duty.		
	(3) Rubber tires other than pneumatic, *ad val.*	25%	35%
	OTHER GOODS.		
332.	(a) Syringes, enemas, injection bottles, urinals, air and water beds and cushions and pillows; cut-sheet surgical tubing, *ad val.*	20%	25%
	(b) Rubber manufactures n. e. s., articles n. e. s., in which rubber forms a part, including bandages, elastic stockings, knee caps, thigh pieces, wristlets, leggings, hat-makers' press bags and rings, gas bags, soles, pads, heels, cash mats, rubber tired fabric, tire rubber, rubber stoppers, photographic accessories, *ad val.*	25%	35%
	(c) Floor and carriage mats of rubber, *ad val.*	15%	20%

375.	(b) Atomizers, fumigators, odorizers, vaporizers, etc. ..... *ad val.*	15%	20%
379.	Blankets, rubber, for printing machines.....	Free.	Free.
399.	Fire hose, rubber-lined, 2½ inches in diameter and over ..... *ad val.*	Free.	5%
419.	Surgical pessaries; dental rubber.....	Free.	Free.

NEW ZEALAND.

Tariff No.		General Tariff. £ s. d.	Tariff on Goods of British Origin. £ s. d.
	RUBBER CEMENT.		
401.	Rubber solution or cement.....	Free.	Free.
	BELTING, HOSE AND PACKING.		
452c.	Rubber endless belts for concentrators (to remain free of duty after March 31, 1908).		
479A.	Machine belting other than leather, cordage or rope ..... *ad val.*	10%	Free.
481A.	All kinds of hose, tubing or piping..... *ad val.*	20%	Free.
486A.	Engine packing	Free.	Free.
	BOOTS AND SHOES.		
106.	Shoes or goloshes, known as "plimsolls," with molded rubber soles..... *ad val.*	33⅓%	22½%
107.	Champion, gymnasium, yachting and lawn-tennis boots and shoes, with molded rubber soles. *ad val.*	33⅓%	22½%
107A.	Goloshes and overshoes of all kinds, of rubber ..... *ad val.*	33⅓%	22½%
397.	Boot elastic	Free.	Free.
398A.	Children's goloshes, sizes 0-6..... *ad val.*	10%	Free.
398B.	Molded rubber soles..... *ad val.*	10%	Free.
401.	Rubber heels	Free.	Free.
486D.	Gum boots, half knee, knee or thigh, with soles of leather or rubber.....	Free.	Free.
	TIRES, ETC.		
438A.	Tires, pneumatic tires, rubber covers, inner tubes attached or not, to bicycles, tricycles, or motorcycles	Free.	Free.
470.	The same for carriages, wagons, automobiles, etc., attached to the vehicles, or not.....	Free.	Free.
	OTHER GOODS.		
368.	Dental rubber	Free.	Free.
370.	Brace elastic	Free.	Free.
396.	Waterproof material, combined with rubber....	Free.	Free.
439.	Rubber gloves for beekeepers.....	Free.	Free.
446A.	Insulated cable and wire, vulcanite insulating material, rubber or gutta percha solutions, insulating tape	Free.	Free.
449B.	Rubber tubing, in short lengths, for handles of tennis racquets, cricket bats, etc..... *ad val.*	20%	Free.
489.	Rubber gloves, rubber pump valves.....	Free.	Free.

Africa.

LIBERIA.

There is an export duty of 12 cents per pound on rubber from Liberia.

Tariff No.	UNION OF SOUTH AFRICA.	Rate Ad Valorem.
78.	Bands and belting of all kinds for machinery, boiler tubes, bolting, cloth and mill silk.....	3%
98.	Rubberoid	3%
109.	Unmanufactured rubber	3%
119.	Machine packing	3%
121.	Pipes, piping and tubes of all kinds.....	3%
193.	All goods not elsewhere specified..... [Note.—3% ad valorem will be rebated on goods the growth, produce, manufacture of the United Kingdom and reciprocating British Colonies.]	20%

British Standard List of Rubber Tyres for British Standard Rims.[1]

THE URGENT NEED for reducing the great number of sizes of rubber tyres in use on automobiles having been recognized by the British Rubber Tyre Manufacturers' Association, a scheme for that purpose was suggested by them and submitted to the British Engineering Standards Association for consideration and eventual issue as British Standards.

The scheme was considered and certain modifications were made to the proposals and these are embodied in the present report and have been accepted by the British Rubber Tyre Manufacturers' Association.

In consultation with the American Society of Automotive Engineers (one of the sponsor bodies of the American Engineering Standards Committee) the S.A.E. Standard Tyre sizes, both pneumatic and solid, have been included in the list, a further step thus being taken in the direction of Anglo-American co-operation.

As the standard list of rubber tyres is urgently required by the automobile industry, the present memorandum is issued as an interim measure pending the revision of the British standard reports affected.

The dimensions of the tyres given in this memorandum are nominal, whilst those of the rims are actual. The sizes of the tyres are the usual trade description as applied to tyres designed to fit the respective rims. Full size dimensioned drawings of the rim sections are in course of preparation.

It is to be understood that the British Engineering Standards Association in no case guarantees that the goods bearing its mark are made to the standard sections and specifications issued by it. The mark is to be regarded as no more than *prima facie* evidence adduced by the manufacturer that the goods are made in accordance with the standard sections issued by the British Engineering Standards Association.

PART 1. PNEUMATIC TYRES AND RIMS.

SCHEDULE A (SEE PLATE 1).

BRITISH STANDARD LIST OF CYCLE TYRES FOR BRITISH STANDARD RIMS.

WIRED TYPE. Nominal Size and Marking of Tyre. Inches.	Millimeters.	Rim required.	BEADED EDGE TYPE. Nominal Size and Marking of Tyre. Inches.	Millimeters.	Rim required.
22 × 1¾	550 × 32	F. 2			
24 × 1¾	600 × 32	F. 3			
26 × 1½	650 × 38	F. 9	26 × 1½	650 × 38	B. 4
28 × 1½	700 × 38	F. 16	28 × 1½	700 × 38	B. 5
26 × 1¾	650 × 44	F. 12			
28 × 1¾	700 × 44	F. 13	28 × 1¾	700 × 44	B. 8

The above range includes all sizes regarded as necessary for the equipment of all types of cycles—juveniles, standard roadsters, and carriers—excepting only racing machines. It is not proposed to standardize either tyres or rims of special racing types.

SCHEDULE B (SEE PLATE 2).

BRITISH STANDARD LIST OF MOTOR CYCLE TYRES FOR BRITISH STANDARD RIMS.

BEADED EDGE TYPE ONLY.

Nominal Size and Marking of Tyre. Inches.	Millimeters.	Rim Required.
24 × 2½	600 × 55	D. 1
26 × 2½	650 × 55	B. B.
26 × 2½	650 × 65	B. B.
26 × 3	650 × 75	C. C. 1
28 × 3	700 × 75	C. C. 2

SCHEDULE C (SEE PLATE 3).

BRITISH STANDARD LIST OF LIGHT CAR TYRES FOR BRITISH STANDARD RIMS.

BEADED EDGE TYPE ONLY.

Nominal Size and Marking of Tyre. Inches.	Millimeters.	Rim Required.
26 × 3	650 × 75	C. C. 1
27 × 3½	685 × 90	C. C. 1
28 × 3½	700 × 90	28 L. C.
29 × 4	735 × 100	28 L. C.

In view of the unsatisfactory range of light car tyre and rim sizes hitherto available, this new range of two rims with two sections of tyre for each rim is adopted.

(The present 650 × 65 and 700 × 80 tyres will go on to the C.C. 1 rim.)

SCHEDULE D (SEE PLATES 4 AND 5).

BRITISH STANDARD LIST OF MOTOR TYRES FOR BRITISH STANDARD RIMS.

BEADED EDGE TYPE.

Nominal Size and Marking of Tyre.	Rim required.
Inches.	
30 × 3½	30 B. E.
31 × 4	30 B. E.
Millimeters.	
815 × 105	815 B. E.
815 × 120	815 B. E.
820 × 120	820 B. E.
820 × 135	820 B. E.
880 × 120	880 B. E.
880 × 135	880 B. E.
895 × 135	895 B. E.
895 × 150	895 B. E.

SCHEDULE E (SEE PLATE 6).

BRITISH STANDARD LIST OF MOTOR TYRES FOR BRITISH STANDARD RIMS.

WIRED TYPE FOR STRAIGHT-SIDED RIMS.

Nominal Size and Marking of Tyre. Inches.	Millimeters.	Rim required.
32 × 3½	815 × 90	S. S. 32 × 3½
33 × 4	840 × 105	S. S. 32 × 3½ or S. S. 33 × 4
32 × 4	815 × 105	S. S. 32 × 4
33 × 4½	840 × 120	S. S. 32 × 4
32 × 4½	815 × 120	S. S. 32 × 4½
33 × 5	840 × 135	S. S. 32 × 4½
34 × 4½	865 × 120	S. S. 34 × 4½
35 × 5	890 × 135	S. S. 34 × 4½

SCHEDULE E—Continued (SEE PLATE 7).

BRITISH STANDARD LIST OF COMMERCIAL VEHICLE TYRES FOR BRITISH STANDARD RIMS.

36 × 6	915 × 150	S. S. 36 × 6
38 × 7	965 × 175	S. S. 38 × 7
40 × 8	1015 × 200	S. S. 40 × 8

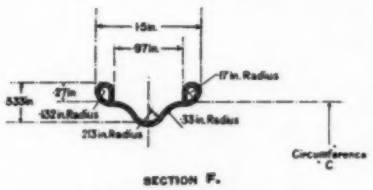
[1] Adopted by the British Engineering Association, April 14, 1920. Copyright. All rights reserved.

Plate 1.

BRITISH STANDARD

RIMS FOR CYCLES.

(WIRED TYPE.)

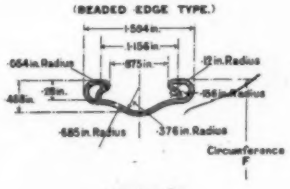


SECTION F.

Thickness ·032 in. (No. 21 S.W.G.).

Rim No.	Size of Tyre to Fit.	Circumference C.
	inches.	
F. 2	22 × 1¾	62·000
F. 3	24 × 1¾	66·750
F. 9	26 × 1¾	72·250
F. 10	28 × 1¾	78·500
F. 12	26 × 1¾	70·625
F. 13	28 × 1¾	77·000

(BEADED EDGE TYPE.)



SECTION B.

Thickness ·032 in. (No. 21 S.W.G.).

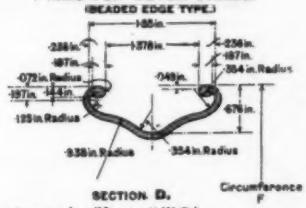
Rim No.	Size of Tyre to Fit.	Circumference F.
	inches.	
B. 4	24 × 1¾	73·500
B. 5	26 × 1¾	80·250
B. 6	28 × 1¾	78·5625

Plate 2.

BRITISH STANDARD

RIMS FOR MOTOR CYCLES.

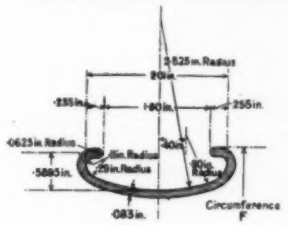
(BEADED EDGE TYPE.)



SECTION D.

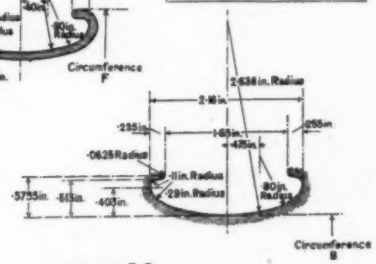
Thickness ·072 in. (No. 15 S.W.G.).

Rim No.	Size of Tyre to Fit.	Circumference F.
	inches.	
D. 1	24 × 2¼	64·174



SECTION B.B.

Rim No.	Size of Tyre to Fit.	Circumference F.
	inches.	inches.
B.B.	26 × 2¼ and 26 × 2½	71·261



SECTION C.C.

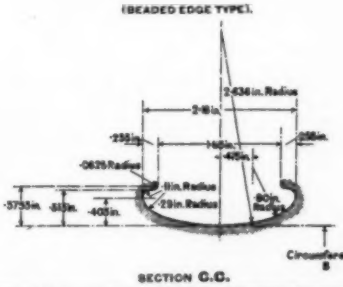
Rim No.	Size of Tyre to Fit.	Approximate Circumference B.	Rim Dia. at Tyre Seat.
	inches.	inches.	inches.
C.C. 1	26 × 3	69·632	20
C.C. 2	28 × 3	69·115	22

Plate 3

BRITISH STANDARD

RIMS FOR LIGHT CARS.

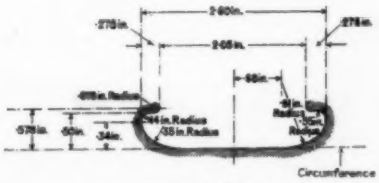
(BEADED EDGE TYPE).



SECTION C.C.

Rim No.	Size of Tyre to Fit.	Approximate Circumference B.	Rim Dia. at Tyre Seat.
	inches. inches.	inches.	inches.
C.C. 1	26 × 3 and 27 × 3½	69·832	20

This is the same as the Motor Cycle C.C. 1 Rim.



SECTION 28 L.C.

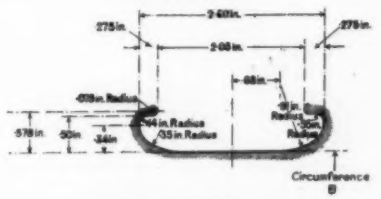
Rim No.	Size of Tyre to Fit.	Approximate Circumference B.	Rim Dia. at Tyre Seat.
	inches. inches.	inches.	inches.
28 L.C.	28 × 3½ and 29 × 4	85·973	21

Plate 4

BRITISH STANDARD

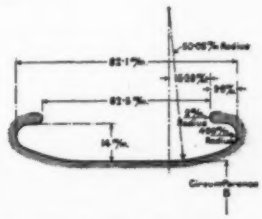
RIMS FOR MOTOR CARS.

(BEADED EDGE TYPE.)



SECTION 30 B.E.

Rim No.	Size of Tyre to Fit.	Approximate Circumference B.	Rim Dia. at Tyre Seat.
	inches. inches.	inches.	inches.
30 B.E.	30 × 3½ and 31 × 4	72·257	23



SECTION 815 B.E.

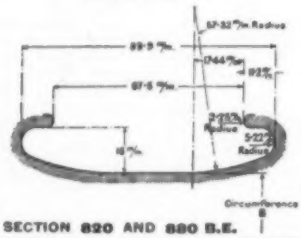
Rim No.	Size of Tyre to Fit.	Circumference B.	Approximate Rim Dia. at Tyre Seat.
	millimetres. millimetres.	millimetres.	millimetres.
815 B.E.	815 × 105 and 815 × 120	1924	612·4

Plate 5.

BRITISH STANDARD

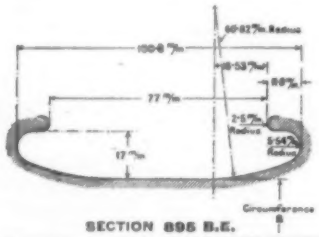
RIMS FOR MOTOR CARS.

(BEADED EDGE TYPE.)



SECTION 820 AND 880 B.E.

Rim No.	Size of Tyre to Fit.	Circumference B.	Approximate Rim Dia. at Tyre Seat.
	millimetres.	millimetres.	millimetres.
820 B.E.	820 × 120 and 820 × 135	1780	566·6
880 B.E.	880 × 120 and 880 × 135	1980	630·2



SECTION 895 B.E.

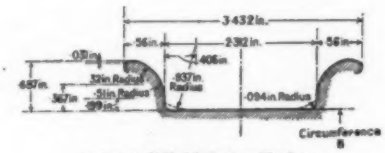
Rim No.	Size of Tyre to Fit.	Circumference B.	Approximate Rim Dia. at Tyre Seat.
	millimetres.	millimetres.	millimetres.
895 B.E.	895 × 135 and 895 × 150	1855	590·4

Plate 6.

BRITISH STANDARD

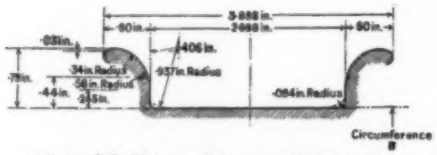
RIMS FOR MOTOR CARS.

(STRAIGHT-SIDED FOR WIRED TYPE TYRES)



SECTION S.S. 32 ins. × 3½ ins.

Size of Tyre to Fit.	Approximate Circumference B.	Rim Dia. at Tyre Seat.
inches.	inches.	inches.
32 × 3½ and 33 × 4	78·540	25



SECTION S.S. 32 ins. × 4 ins. and 33 ins. × 4 ins.

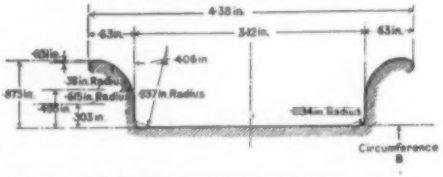
Size of Tyre to Fit.	Approximate Circumference B.	Rim Dia. at Tyre Seat.
inches.	inches.	inches.
32 × 4 and 33 × 4½	75·398	24
33 × 4 and 34 × 4½	78·540	25

Plate 7.

BRITISH STANDARD

RIMS FOR MOTOR CARS.

(STRAIGHT-SIDED FOR WIRED TYPE TYRES).



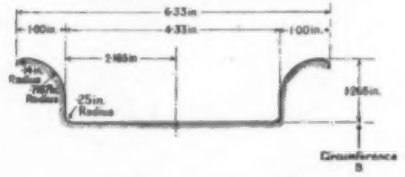
SECTION S.S. 33 ins. × 4½ ins. and S.S. 34 ins. × 4½ ins.

Size of Tyre to Fit.	Approximate Circumference B.	Rim Dia. at Tyre Seat.
inches.	inches.	inches.
32 × 4½ and 33 × 5	72·257	23
34 × 4½ and 35 × 5	78·540	25

BRITISH STANDARD

RIMS FOR COMMERCIAL VEHICLES.

(STRAIGHT-SIDED FOR WIRED TYPE TYRES.)



SECTION S.S 36 ins. × 6 ins.

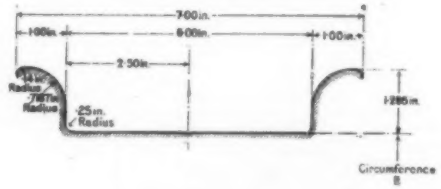
Size of Tyre to Fit.	Approximate Circumference B.	Rim Dia. at Tyre Seat.
inches.	inches.	inches.
36 × 6	75·398	24

Plate 8

BRITISH STANDARD

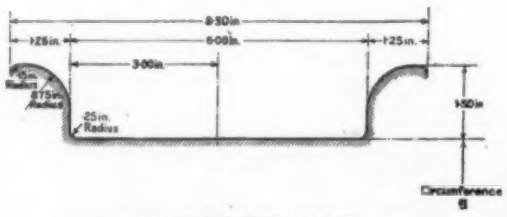
RIMS FOR COMMERCIAL VEHICLES.

(STRAIGHT-SIDED FOR WIRED TYPE TYRES).



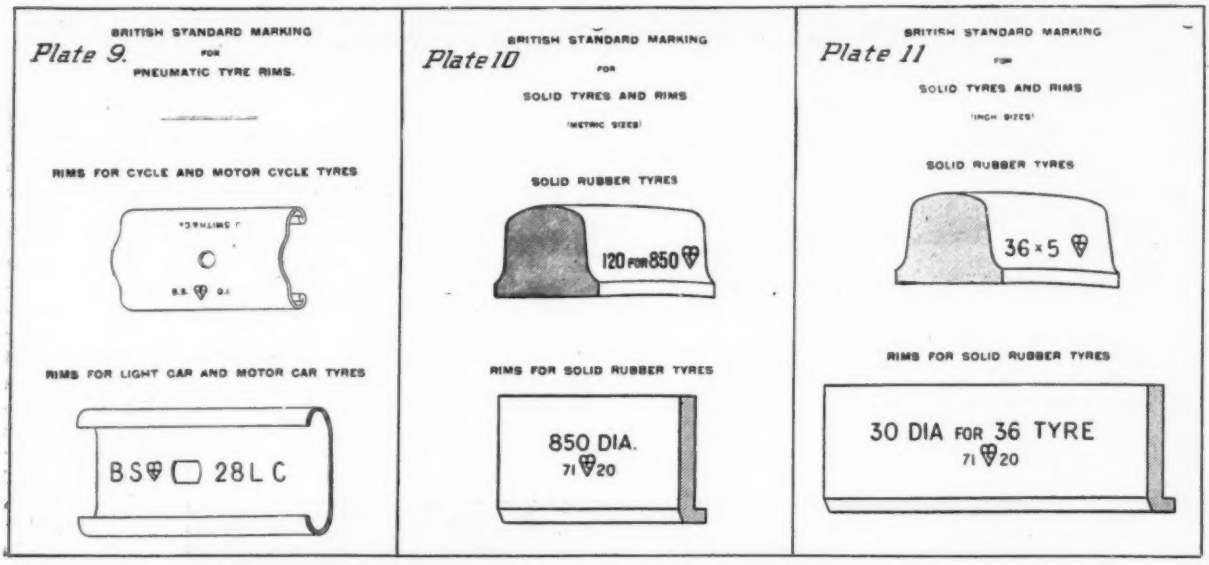
SECTION S.S. 38 ins. × 7 ins.

Size of Tyre to Fit.	Approximate Circumference B	Rim Dia. at Tyre Seat.
inches.	inches.	inches.
38 × 7	75·398	24



SECTION S.S. 40 ins. × 8 ins.

Size of Tyre to Fit.	Approximate Circumference B.	Rim Dia. at Tyre Seat.
inches.	inches.	inches.
40 × 8	75·398	24



PART 2. SOLID RUBBER TYRES AND RIMS.

SCHEDULE F.

BRITISH STANDARD LIST OF SOLID RUBBER TYRES (PRESSED ON BAND TYPE) FOR BRITISH STANDARD RIMS.

METRIC SIZES.

Wheel Rim Diameters. Millimeters.	Tyre Sections (Width at Base). Millimeters.					
670	..	..	..	140	160	180
720	90	100	120	140	160	180
771	..	100	120	140	160	180
850	90	100	120	140	160	180

Sections larger than 180 mm., if made as single tyres in lieu of twins, to be made to 850 mm. rim diameter only.

INCH SIZES.

Nominal Overall Tyre Diam. Inches.	Tyre Sections (Width at Base). Inches.										Actual Rim Diam. Inches.
32	3	3½	4	..	..	..	..	..	..	..	26
34	..	3½	4	5	..	..	..	..	..	..	28
36	..	3½	4	5	6	7	8	10	..	..	30
40	..	..	..	5	6	7	..	10	12	14	34

Note.—The figure 71 in the marking in plates 10 and 11 refers to the number of the British Standard Report on Wheel Rims and Tyre Bands for Solid Rubber Tyres, and the figure 20 to the year of its issue (*i. e., Report No.* 71-1920).

THE NEED OF TIRE STANDARDIZATION.

An analysis of the size of the tires used on the cars described in the "Handbook of Automobiles" shows how far we are from standard sizes, though the majority of the passenger cars use tires that differ less than an inch from each other.

On all the pleasure cars the front and rear wheels are of the same size and out of 151 pleasure vehicles 35 have wheels with tires 32 by 4, 20 measure 32 by 4½, and 27 measure 33 by 4. The other measurements given are 35 by 5, 11 cars; 34 by 5½, one car; 34 by 4½, 24 cars; 34 by 4, one car; 33 by 5, 12 cars; 33 by 4½, 5 cars; 32 by 3½, 4 cars; 31 by 4, 5 cars; 30 by 3½, 6 cars.

The variety in the tires of commercial trucks is far greater; out of 77 trucks, 25 have front and rear tires of the same size, and of these 7 take tires 36 by 5, with front wheels single solid and rear wheels dual solid, while two have single solid tires 36 by 5, both front and rear. Six trucks take size 36 by 4, front single solid, rear dual solid; six have pneumatic tires, one 36 by 6, two 35 by 5, two 34 by 4½, and one 31 by 4. The other sizes of solid tires for cars with like front and rear wheels are 40 by 6, 36 by 7, 36 by 6 and 33 by 4, one of each.

With a few exceptions, in the case of dissimilar wheels, there are as many varieties of tire combinations as there are cars. Ten cars out of 52 take 36 by 4 single solid tires for front wheels and 36 by 7 single solid tires for the rear wheels; 5 cars, 36 by 6 single solid front and 40 by 6 dual solid rear; 4 cars, 36 by 5 single solid front and 40 by 6 dual solid rear. The other 33 cars use twenty-six different sizes or combinations of sizes, ranging from 38 by 7 pneumatic and 38 by 4 solid to 32 by 2½ solid for front wheel tires and 42 by 12 solid and 42 by 9 pneumatic to 32 by 3 solid for rear wheel tires.

One reason for the lack of uniformity in tire measurements is the great diversity in size and carrying capacity of the trucks, one being rated at 7½ tons, 12 at 15 tons, 18 at 3½, 11 at 2½, 10 at 2, with cars of every intermediate and smaller capacity down to 1,000 pounds and 750 pounds.

WESTINGHOUSE EMPLOYES INSURED.

An insurance policy for $500 will be given entirely without cost to every employe of the Westinghouse Electric & Manufacturing Co. who has been in the service of the company for a period of six months or more, according to a plan effective March 1, 1920. In addition, the employes, after April 1, may increase the value of their policies to amounts varying from $1,000 to $2,000, depending upon their length of service and continuity of savings.

All employes who have been in the company's service for six months or longer and who deposit a sum each pay-day in the Employes' Savings Fund, equal to 2 per cent or more of their earnings, will not only receive 4½ per cent interest compounded semi-annually on such deposits, but in addition will automatically have their insurance increased to amounts up to $2,000, depending on the length of time they have been with the company. For example, a man who has been in the service of the company for at least 15 years and has regularly deposited in the Employes' Savings Fund 2 per cent or more of his salary is presented with an insurance policy for $2,000.

After an employe has maintained the required deposits for a period of five years he may discontinue or withdraw his deposits from the savings fund without in any way affecting the value of his insurance policy.

In order to provide for employes who need money and do not wish to disturb their savings and thus affect their insurance, loans will be made by the company to the extent of 90 per cent of the amount to the credit of the employe in the savings fund.

This plan of insurance is to be made effective at all of the various offices and plants of the Westinghouse company and will affect approximately 50,000 persons.

The Goodyear Industrial University.

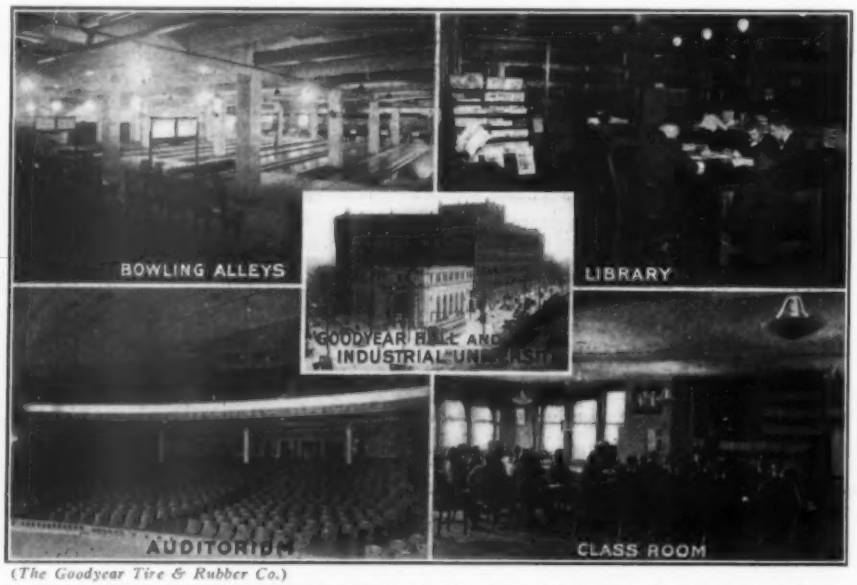
By Ralph C. Busbey.

IN AN EFFORT to more comprehensively and effectively humanize industry, and to further its fundamental principle of preserving the human element by building men and women as well as product, there has just been established in Akron by The Goodyear Tire & Rubber Co., an institution known as Goodyear Industrial University. It is not only the world's first industrial university, but an educational institution without parallel in the wide range of studies embraced in its curriculum, and in the democratic personnel of its student body.

Goodyear University with a faculty of 115, and an enrollment of more than 5,500 men and women, including executives, office employes and manual workers among the company's 35,000 Akron employes, has commodious and fully equipped quarters in Goodyear Hall, the newly dedicated recreational building, said to be one of the finest buildings ever erected by an industrial concern for the welfare and physical and mental developments of its employes.

A GREAT HUMANIZING EFFORT.

The Hall and University were dedicated simultaneously on April 17, when William Oxley Thompson, president of Ohio State University, paid tribute to the broad vision and fundamental principles underlying the motives of the founders of this institution, characterizing its establishment as one of the greatest humanizing efforts known to the industrial world. He predicted that the university would prove a potent factor in stabilizing industry, in allaying industrial unrest, and in bringing about a broader and better understanding between capital and labor and a more harmonious relationship between industrial heads and manual workers.



(The Goodyear Tire & Rubber Co.)

GOODYEAR INDUSTRIAL UNIVERSITY IS FUNDAMENTALLY AN INDUSTRIAL INSTITUTION, TEACHING SUCH BRANCHES OF ACADEMIC AND SCIENTIFIC WORK AS ARE NECESSARY TO THE DEVELOPMENT OF AMERICAN INDUSTRY.

DEDICATED TO GOODYEAR MEN AND WOMEN.

A dedicatory tablet in the hall contains a thoughtful and abiding message that expresses the purpose of the institution. It reads:

GOODYEAR HALL.

To Goodyear men and Goodyear women, whoever they may be, a great army of people, touching hands around the globe; to education and fellowship; to the forwarding of every right ambition; to the realization for every man and every woman of his usefulness to self, family, company and country; to better understanding between man and man, between management and men; to mutual helpfulness and service; to the fullest loyalty to America and the fulfillment of her promise of moral, intellectual and industrial leadership among the nations; to loyalty and friendship and fair dealing and good will—to these purposes this building is soberly and prayerfully DEDICATED.

DOORS OF LEARNING OPEN TO ALL.

Fundamentally, Goodyear University is an industrial institution teaching such branches of academic and scientific work as are necessary to the development of American industry. Its doors of learning are open to all alike. It is for the lad 16 to 18 years of age, forced out of school to help support a fatherless family. It is for the foreign-born rubber worker anxious to become Americanized. It is for the illiterate, anxious to overcome his handicap and to learn the rudiments of American education. It is for the high school or grade school graduate who could not avail himself of the opportunity of a college education. It is for men and women whose college careers were incompleted and for college graduates anxious to go higher and train themselves along specific scientific lines calculated to fit them best for a further pursuance of their vocation in the great rubber industry. It is for manual workers and factory foremen alike; for office clerks and office executives.

CURRICULUM EMBRACES WIDE RANGE OF STUDY.

There are 600 separate classes which are so conducted as to permit attendance of office employes and to factory workers from all three daily eight-hour shifts. Courses are provided ranging from the fundamentals of rudimentary grade school education to the post-graduate courses in mechanical and chemical engineering and rubber chemistry and rubber technology, the curriculum embracing a wide range of study. There are four distinct divisions, the production school, sales school, school of commerce and school of household arts. A few of the specialized studies are mathematics, mechanical drawing, physics, chemistry, engineering, personnel in business, better letter writing, organization management, corporate organization, finance, business economics and effective stocking. These latter courses are more specifically for executives and office employes aspiring to executive capacity.

Members of the production or flying squadron, men who are either experts or studying to become proficient in factory production matters, are offered a three-year specialized course, upon completion of which diplomas are granted with a degree of Master Rubber Worker. Members of the engineering flying squadron are offered a three-year course in which to qualify for the degree of Graduate Rubber Mechanic.

SPECIAL APPRENTICE CLASSES.

There are special apprentice classes for beginners in factory work where skilled labor is essential. The apprentice machinists' course is for three years, also that for an apprentice draftsman. The former courses are so conducted that young boys may enter the factory and receive a remunerative wage while they are learning. They devote 36 hours a week to shop work and 10 hours to classes, receiving pay for the full 46 hours. Every six months a nominal increase is granted, the amount depending upon each apprentice's ability to grasp details and advance in his machine work. At the end of the three-year course, he is an expert machinist and is eligible for another three-year course in which he can be trained as a foreman or factory mechanical executive.

The special vocational course for foremen and factory executives covers a year of study and class work, while there is also offered an 18 months' course for inspectors. There are at present 1,000 inspectors taking this course and over 2,500 taking the production school course, while 350 shift foremen are specializing in study to fit them for higher executive positions. Stenographic and typist courses are offered also for girls, in addition to those in the school of household arts, including classes in domestic science, housekeeping and sewing.

SPECIAL COURSES FOR MUTES.

One of the interesting courses will be that for instruction in the mute language. Over 700 deaf or silent men and women are employed in factory and office work. They have their own community activities, but are thrown into such constant contact with those not deprived of speech and hearing, that many of the latter desire to learn the silent language in order to converse with them without resorting to the pad and pencil. This course will be for speaking persons. There are also special courses for the mute men and women. The most popular among these for men is the mechanical drawing class. There are, all told, over 300 mutes enrolled in special classes designed for their benefit.

THE DREAM OF VICE-PRESIDENT LITCHFIELD REALIZED.

Perhaps no one man is more directly responsible for the establishment of the university than Paul W. Litchfield, vice-president and factory manager. He long has been the mainspring of all recreational and educational activities, and Goodyear Hall, his dream of several years ago, has finally materialized. Mr. Litchfield is chairman of the Goodyear Board of Education, having direct charge of the university's affairs. Harry Blythe, who is manager of Goodyear Hall and the head of the university, is 30 years of age and a graduate of Mt. Union College, Alliance, Ohio. A. C. Horrocks is head of the factory school, while Coach Ed Connor is head of physical education. Other members of the faculty are: Dr. John A. Custer, who for many years occupied the Chair of History at Lawrence College, Appleton, Wisconsin, and Professor W. A. Emery, formerly of Carnegie Institute of Technology at Pittsburgh. Special language instructors also have been engaged for classes in Spanish, Portuguese, and other languages.

GOODYEAR HALL AFFORDS COMPLETE UNIVERSITY ACCOMMODATIONS.

Goodyear Hall, which contains complete university accommodations, including faculty office suites, 65 large class rooms, lecture and assembly rooms, and several fully equipped laboratories, is complete as to facilities and equipment for mental and physical development, and recreation of the employes.

The auditorium is of the acoustic shell style of architecture, and will seat 1,686 people. The French Renaissance scheme of interior decoration is used throughout, with an indirect lighting system. Two mural paintings adorn the side walls: one of the Bay of Naples with Mt. Vesuvius in the distance, the other a South American scene, picturing natives in the Amazon region loading rubber for export. There are rest rooms for women, smoking rooms for men, and check rooms.

The stage has double aperture, serving, either separately or simultaneously, the auditorium or the gymnasium. It is forty feet wide and thirty-three feet deep with floor laid in sections to permit its removal for installation of swiming tanks, ice skating rinks or other appurtenances for extraordinary acts. A complete counter-weighting system is employed for shifting scenery for either the auditorium or the gymnasium. The gymnasium with balcony and main floor has a seating capacity of more than 5,000. The floor is of sufficient size to permit five games of basket-ball to be played simultaneously. Below the gymnasium are 5,500 locker rooms for men and 54 individual shower baths. For women there are 200 lockers and 18 shower baths in addition to community and lounge rooms and dormitories.

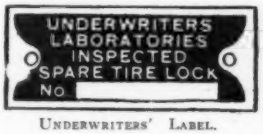
On the third floor of Goodyear Hall are legislative chambers for the industrial legislators of the Goodyear Industrial Republic House and Senate. They are patterned closely after the Senate and House Chambers at Washington in respect to floor arrangement, with spectators' galleries, anterooms and private offices.

The cafeteria on the sixth floor is capable of accommodating 4,000 people an hour and is the largest in Akron and one of the largest in Ohio. Beside the three main entrances to Goodyear Hall, entrance can also be gained through a tunnel leading from the factory building, thus enabling employes to enter the building and avoid inclement weather and street traffic.

As for the university itself, its establishment has been conducive to more harmonious relationship between capital and labor in Akron. The university constitutes a unique experiment and one which is being watched by the entire world. It is proving remarkably successful so far, as indicated by the large enrollment, and should be copied extensively by other industrial concerns in America. Its enrollment is steadily mounting and has increased from 4,000 originally to nearly 6,000, while officials of the university state that they expect an enrollment of nearly 8,000 by July first.

INSPECTED SPARE TIRE LOCKS.

The Underwriters' Laboratories, 207 East Ohio street, Chicago, Illinois, and its branches, maintain a system of inspection at factories and labeling of products which have been examined and tested by the laboratory staff. A list of recently inspected spare tire locks follows:



UNDERWRITERS' LABEL.

"ABLE.". Able Manufacturing Co., San Francisco, California. Two types: one type consisting of steel loop secured by combination lock, another type consisting of case-hardened steel chain secured by combination lock. Locks spare tire to rear springs or to frame in such a manner that tire and spring or frame are both encircled by device which is held together with a combination lock. Loop or chain is secured to spring or frame to prevent rattling or loss when not in use. Designed for use on all types of automobiles in which it is possible to loop device around frame or spring.

"BULL DOG." The Automatic Equipment Co., submittor, St. Louis, Missouri. Ordinance Tool Manufacturing Co., manufacturers, St. Louis, Missouri. Spare tire lock for use on all automobiles equipped with a tire carrier of the internal rim type, and in which tire carrier is not readily removable.

"UNIVERSAL." Johnson Automobile Lock Co., Chicago, Illinois. For use on all types of automobiles in which tire carrier is not readily removable.

THE BEST ADVICE THAT CAN BE GIVEN TO THE OWNER OF A Liberty Bond is this: Hold the bond you bought during the war; it is as safe and sound as the United States Government itself. Buy as many more at the present low rate as you can afford.

Practical Tire Repairing.

By A. B. Zwebell.

THE FOLLOWING DETAILED METHODS of repairing fabric and cord tires are taken from the practical experience of an expert tire repairman. The instructions for cutting and building as here given will produce the longest tire service if followed. This system saves material because of the fact that a large section of fabric and rubber around the point of injury is not removed. The injury is repaired without removing a great deal of the original material and the new materials are firmly locked in place.

GENERAL INFORMATION.

(1.) Never attempt sectional repairs on tires with tread or fabric loose in many places.

(2.) Be sure of your decision as to the kind of repair to be made before starting to work.

(3.) Determine the length of the injury and the dead fabric if any.

(4.) All tires must be thoroughly dry for good work.

(5.) All dirt and dead material must be removed.

(6.) Aim to eliminate the injury and possibility of friction in the repair.

(7.) It is not necessary to cut away large portions of the tread or step down several plys of fabric to secure a satisfactory repair. Experience teaches that this is not good practice. In stepping down the original fabric the carcass is weakened. It is then necessary to replace the removed fabric with new material. Take the stretch out of the fabric. This requires the skill of a practiced workman, and unless it is carefully done the repair will bulge. When tires are built the fabric is stretched over the core by machinery; therefore, it would be difficult to exercise sufficient strength by hand to take the stretch out of the fabric. New fabric takes longer to cure and a great many repairs leave the shop undercured, causing separation, bulging, and finally a defective repair.

(8.) Skive down the fabric around the hole. This overcomes friction and what is termed a hinge in the repair.

(9.) Round all breaks at the end to stop further breaking.

(10.) Sectional repairs that fall down are usually due to the following:

(a) Not slitting the fabric back far enough. (b) Lack of thorough cure. (c) Hinges at the point of injury caused by neglected skiving. (d) Lack of air-bag pressure. (e) Dirty stock. (f) Insufficient cement or allowing it to become too dry.

BUFFING.

Always buff inside and outside of the repair, removing all dirt and dead material, and carry the buffing over the repair slightly to roughen the job so that the cement will adhere easily. If the buffer does not reach all points use a scraper or knife after softening with gasoline.

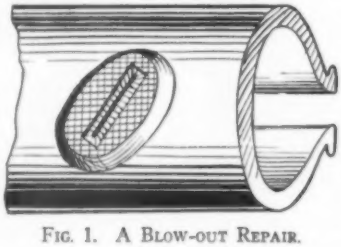


FIG. 1. A BLOW-OUT REPAIR.

CEMENTING.

All repairs must be dry before cementing. Three coats are applied, allowing each to dry fully, the time required depending upon weather conditions. Brush the cement over the repair slightly to allow for trimming. Always run or inject cement between loose plys of fabric and hang the tire in a position that will allow the excess cement to drain. Do not use home-made cement in making sectional repairs. Use only first-class material. Cemented tires should not be placed in a draft as the cement will crust over and remain damp underneath. Cement can be dried too long and lose adhesiveness. Stir the cement thoroughly before using.

If you accumulate cushion gum and fabric scrap, cement can be made by mixing one pound of cushion gum with one gallon of high test gasoline. Add 1 ounce of wood alcohol for cutting. The mixture should be well stirred. The use of home-made cement should be confined to cementing or curing boots and inner liners into tires.

BUILDING.

Building stocks should be hung on the wall in a fairly dry place and protected from dust, soapstone, etc. Cut all fabric on the bias and trim the selvages. Lap the fabric when connecting. Have the cement dry before working on the casing. Remove soapstone or oil on the gum by washing with high test gasoline. Do not be alarmed if the repair stock is bloomed, this is merely the free sulphur working to the surface. Remove the bloom with high test gasoline. Handle repair stock with clean hands. Stretch all fabric when applying to the job. Roll and stitch the repair thoroughly before trimming. Perforate all repairs with air vents before curing. Do not use a spliced ply of fabric directly over the injury or over the bead. Trim all edges and splices down before curing. Always fill holes with cushion gum. It is advisable to use a ply of 1/32-inch cushion gum between the band ply and the reclaimed shoe. Endeavor to keep unevenness out of the repair as it usually hinges and breaks. If the gum sticks to the holland liner, wet the opposite side with gasoline.

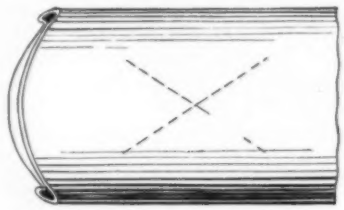


FIG. 2. CUT INSIDE FABRIC PLY DIAGONALLY.

REPAIRING A SMALL BLOW-OUT.

Any repairman or individual contemplating going into the tire repair business can make successful repairs by following these directions and by a little common sense. The following instructions are for repairing an ordinary blow-out when the injury does not extend over 3 inches in length:

(1.) Place the tire on a building mandrel, and cut away all loose and uneven particles of rubber, starting and slanting the cut 45 degrees to give more uniting surface. Cut through the breaker.

(2.) Skive down two or three plys of fabric at the point of injury. This depends upon the size and number of plys of fabric in the tire.

(3.) Buff the outside of the repair. Extend the buffing slightly over the repair and roughen the tread edges so that the cement will adhere.

The above instructions can be easily followed by referring to Fig. 1.

(4.) The next step is to turn the tire. If it is a soft bead clincher it can be turned by the workman over his knee. If it has cable base beads use a tire spreader.

(5.) While the tire is in this turned position, buff the inside of the repair from 6 to 10 inches from the center of the injury. This will depend upon the length of the injury and length of reclaimed fabric shoe to be used.

(6.) Cut the inside or band ply of fabric diagonally as indicated by dotted lines in Figure 2. The length of the cut will depend upon the extent of the injury, advisedly 2 inches beyond the end of the injury and not more than 3 inches. This opera-

tion should be accomplished with a small hook or notched knife.

(7.) Pry the fabric loose with a blunt screw-driver or prodding tool, laying the four wings or ends back as indicated in Fig. 3.

(8.) If the injury is fresh and the fabric clean and sound no further buffing is required as the cement will adhere to the clean cured friction between the plys. Further buffing is necessary only when the fabric has been water logged or is dirty. If the inner plys are water logged, rotted, or exceptionally dirty, one or more plys can be removed, but must be replaced as described in operation 14. Always aim to preserve the inside or band ply as this is the locking ply and holds the repair together.

(9.) Repeat operation 2. Skive down to one ply of fabric in order to remove the stiff joint or hinge.

CEMENTING.

(10.) Three coats are applied, allowing each coat to dry thoroughly. The time required depends upon weather conditions. Cemented tires should not be placed in a draft as the cement will crust over and remain damp underneath. Cement should not be allowed to dry too long or it will loose its adhesiveness. Hang the tire in a clean, dry place, the repaired section on top so that all excess cement can drain.

(11.) Select the proper size reclaimed fabric 3-ply shoe. Cement this at the same time and place with the tire to dry.

BUILDING.

(12.) Place the tire in a building rack or stand and spread the beads apart with bead spreaders. Bring the edges of the injured portion together. The cement being tacky, these edges will immediately unite. Cut a small strip of cushion gum and stitch it in the crevice caused by skiving the edges of the injury. Then fit a new piece of building fabric in the section, taking care to make a good fit. This can be easily accomplished by making a pattern or templet of holland liner as it will not stick to the freshly cemented fabric. After the correct size has been determined, cut a piece of building fabric the exact size of the pattern and stitch this into place, trimming any excess fabric with a hook or notched knife.

(13.) Close up the injury and lock the new fabric in place by bringing the tips of the four wings back to their original position. Stitch them down carefully, starting at the outside and working toward the center. Now cover the edges with strips of cushion gum as indicated by dotted lines in Figure 2.

(14.) If one or more plys have been removed as indicated in operation 8, replace them with a new ply of fabric. This ply should extend at least 1 inch beyond the extreme outside of the dotted lines in Fig. 2. In the event that it is not necessary to remove a ply, lay the 3-ply reclaimed skived shoe in place, centering it well and stitching it down thoroughly from the center out. Dust the inside with soapstone and remove the bead spreaders.

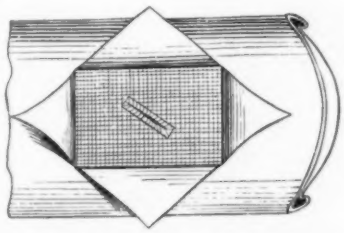


FIG. 3. LAY FOUR ENDS BACK.

(15.) Place the tire on the building mandrel.

(16.) Roll down the edges of the injured portion of the tire which have been previously been brought together in operation 12.

(17.) Fill in all low spots and crevices caused by skiving, with cushion gum, stitching thoroughly.

(18.) Cover the cemented section with a layer of 1/32-inch cushion gum.

(19.) Fill in the portion cut away with tread stock, and stitch thoroughly, perforating the new gum with a pricking awl or porcupine roller.

(20.) Trim down the new gum flush with the tire.

(21.) It is advisable and will result in neater work if the repaired section is buffed lightly with a wire brush or emery wheel. The new gum should be buffed from the center out. Care should be taken not to exercise too much pressure.

(22.) Cure.

REPAIRING A LARGE BLOW-OUT.

When the injury extends over three inches in length, it is usually necessary to lay back the tread.

(1.) Be sure of your decision as to the kind of repair to be made before starting the work.

(2.) Locate the injury and cut away all loose particles of tread. Some repairmen start their splice in the center of the repair and lay back the tread both ways. This method is optional, although the writer believes the single lay-back is more practical as it leaves one end free to work over, and also carries the splice away from the hole as this is filled up with gum and is, therefore, yielding, giving movement to the splice with a tendency to loosen up. Where the break is across the tread completely, make a double lay-back.

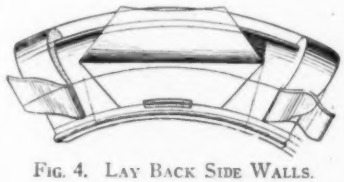


FIG. 4. LAY BACK SIDE WALLS.

(3.) When you have located the place for the splice, cut across the tire, slanting the cut 45 degrees to give more uniting surface. Cut through the breaker.

(4.) On non-skid tires, cut the splice on the highest point as this will give better pressure in the mold when cured.

(5.) Cut under the sides of the tread on both sides with a large notch knife, to the first ply of fabric, one to three inches beyond the end of the break, then peel the tread back, cutting it away from the carcass with a tread knife as you go.

(6.) Strip the side walls down about one inch from the end of the lay-back on both sides and remove or lay back the side walls if in good condition. Figure 4 illustrates the side walls laid back.

(7.) In most cases the bead cover is about one inch above the bead, which is cut over the bead with a hooked nose knife, and removed. Should the tire not have a bead cover, trim the side wall off and treat it as though it was there. The new ply of fabric takes the position of the bead cover when removed.

(8.) Repeat operation 2 under "Repairing a Small Blow-Out."

(9.) Now buff the outside of the tire including the bead, as previously described. The lay-back tread or side wall can be held out of the way by tying them back, or by a series of fish hooks. If fish hooks are used, grind off the barb and attach the pair together at the ends.

(10.) Refer to operation 6 under "Repairing a Small Blow-Out." Instead of cutting the band ply, cut diagonally across the outside ply of fabric. If the injury is of long duration, the outside ply may be rotten. In that event, remove it altogether and perform operation 6 on the second ply.

(11.) Repeat operations 4, 5, 6, 7, 8, and 9 under "Repairing a Small Blow-Out."

BUILDING.

12. Repeat operations 12, 13, 14, 15, 16 and 17 under "Repairing a Small Blow-Out."

In repeating operation 12, if one ply of fabric has been removed, it is advisable to replace this with a new ply placed over the whole repair, ending at the toe of the bead, and extending at least one inch beyond the ends of the diagonal cut shown in Fig. 2.

(13.) Cut a ply of 1/32-inch cushion gum long enough to build up on the lay-back and come down to the heel of the bead.

Stretch and roll the cushion gum thoroughly.

(14.) Cut two strips of side wall gum to match color when cured, and apply on the side of the side wall, starting just over the bead, bringing it out about the tread line and trim smooth.

(15.) Now wash the whole surface where the tread comes down with high-test gasoline to remove dirt, etc.

(16.) Back up the hole in the tread with cushion gum and pull the tread down to fit snugly in place. Be sure to have a strip of cushion between the splice.

(17.) Fill in the hole in the tread, also around the splice and where the tread meets the side wall.

(18.) Stitch, roll and perforate the whole repair well for air vents and trim down smooth. All lay-back sections should be run through a bench tread roller which thoroughly unites the fabric and rubber.

(19.) Cure.

REPAIRING A RIM CUT.

Referring to Figs. 4 and 5, a side section or rim cut repair differs in a lay-back section in that only one side wall is removed and the tread is laid back only when the injury extends four or more inches in total length.

Do not repair a rim cut unless it is an accident. Avoid repairing a tire run under-inflated for the chances are it is weak in other places and will soon blow out at some other point beyond repair. Rim cuts caused by obstacles, curbs, defective rims, etc., can be successfully repaired.

(1.) Locate the injury.

(2.) Remove or lay back the side wall two or three inches beyond the end of the injury. If it is at the heel of the bead, it is not necessary to disturb the tread in most cases. If the injury is above the heel, a portion should be removed as indicated in Fig. 4, or laid back as previously described. In any event, cut away the side wall or tread on a 45-degree angle to allow more surface for uniting again.

(3.) Remove bead strips.

(4.) Skive edges of injury.

(5.) Buff removed portion, carrying the buffing well over the repair and bead.

(6.) The next step is very important, and that is locking the repair in place.

(7.) Cut the fabric horizontally along the heel of the bead about one inch beyond the injury, then slit the fabric on about a 60-degree angle toward the tread at either end of the injury. See heavy line in Fig. 4.

FIG. 5. A RIM-CUT REPAIR.

(8.) Pry the fabric loose and turn it back as indicated in Fig. 4.

(9.) The cutting down from the outside being completed, now turn and buff the tire as previously described. Skive the injury, lift the band ply in the same manner as in operation 7. Now refer to and note operation 8. Cement, select skive shoe, etc.

(10.) Close up the injury with cushion stock as described in operation 8.

(11.) Make a pattern of holland cloth that will extend from under the laid-back inside ply to the laid-back outside ply of fabric. When the pattern has been properly fitted, cut the fabric according to the pattern and stitch in place, being careful to stretch the fabric to avoid a bulge after the tire is put in service. Start building up on the inside and be sure the new fabric is as wide as the widest part of the lay-back.

(12.) Stitch down the fabric lay-back or wing.

13.) Insert a three-ply reclaimed shoe, making sure three plies come flush with the toe of the bead.

(14.) Trim off the portion of the shoe extending over the toe of the bead.

(15.) Finish building up the side wall as heretofore described in detail.

CURING SCALE.

The following scale shows the steam pressure and equivalent degrees in F.

Steam Pressure. Pounds.	Degrees F.	Steam Pressure. Pounds.	Degrees F.
35	280.6	55	302.6
40	286.7	60	307.3
45	292.4	65	311.8
50	298.7		

The time of cure will fluctuate by difference in heat. Aim to work at 50 to 55 pounds pressure.

The above is approximately correct when circulation is entirely open, and represents degrees F. of the steam line, and not at the mold.

The time of cure of the different repairs is in many cases optional with the repair steam man, due to the many makes of vulcanizing plants on the markets and also to the kinds of materials used. It is always advisable for the steam man to take test cures and arrive at curing scales for himself. In fact this is simple, as the different jobs as they come out can be tested with a pencil point and if the impression remains and does not come back to place, a slight amount more of curing will remedy it. Should it be hard or brittle, decrease the cure.

CURING SCALE FOR FABRIC AND CORD FABRIC SECTIONAL REPAIRS.

The following scales have been developed at a large plant using controlled steam at 50 to 55 pounds pressure on standard equipment and can be safely used with the best of results, in any plant with this amount of steam, a slight variation being made to suit the plant in use.

Size. Inches.	Fabric. Minutes.	Cord Fabric. Minutes.	Size. Inches.	Fabric. Minutes.	Cord Fabric. Minutes.
3	45	50	4½	60	70
3½	50	60	5	60	70
4	55	65	5½	65	75

When using an impression pad add 10 to 15 minutes. Cure a fabric tire on the arm about one hour; cord tire, one hour and fifteen minutes.

Cure gray tubes for hole repairs 15 to 20 minutes at 50 pounds. Cure red tubes slightly less than gray tubes. Splices and valve pads take about the same time.

HANDLING HOT CEMENT CLINKER BY RUBBER CONVEYOR BELTING.

An unusual problem in handling hot cement clinkers with a temperature of 200 degrees and over was recently solved at the plant of the Standard Portland Cement Co., Leeds, Alabama, by using a rubber conveyor belt. The clinker, however, could not be cooled sufficiently to prevent scorching of the belt and its rapid destruction. The answer was found by running the belt at an incline of 12 degrees, so that the lower pulley dipped into a trough of water, thus carrying a film of cold water upon the belt, on which the hot clinker from the loading hopper was deposited.

The conveyor was made endless by the use of metal belt fasteners which brought the belt ends tightly together, preventing the clinker ash from getting into the joint and abrading the belt ends. Moreover, in this method of joining no metal came in contact with the pulleys to cause wear and a permanent joint was thus assured.

In six months of operation, this conveyor carried 61,000 tons of clinker and credited saving in belt cost alone to this conveyor is $300. The belt used was made particularly to withstand temperatures to 200 degrees. ("Chemical and Metallurgical Engineering," March 24, 1920.)

Interesting Letters from Our Readers.

FURTHER STUDY FOR NATIVE RUBBER PLANTS.

TO THE EDITOR:

DEAR SIR: The finding of approximately 300,000,000 pounds of rubber in native American plants does not remove the need of further studies, since some of this supply is unavailable except at great expense and the total would not suffice in a long-drawn-out war.

The possibility of bringing the plants into cultivation on a commercial scale even in times of peace should, it seems to me, be further investigated. Such investigations should include the search for better varieties or strains of *Chrysothamnus nauseosus* than we have yet found. Only 12 of the 22 named varieties have been examined. Breeding and selection should also be begun, starting with the best available sorts. Also experiments in changing the cultural conditions in order to increase the deposition of rubber. The pruning experiments, to increase the weight of the rubber-bearing portions and possibly the percentage content are not being continued this year because of the difficulty of getting out to the tract at Benton. This is a promising line of attack.

My interests in the matter are just two, namely, the desire to see the results of our scientific work turned to some practical account, and second, the much broader desire to see our country protected from a possible shortage in this important commodity in time of war. For these reasons I wish that *Chrysothamnus* might soon be given the same attention that has been accorded to guayule or, better yet, that a thoroughgoing investigation be made of all possibilities in the nature of rubber plants suitable for cultivation in America, including guayule, *Chrysothamnus, Haplopappus,* a long list of exotics, and certain native latex plants which we now have under examination and some of which are exceedingly promising.

Several of our leading government botanists and plant breeders are much interested in these matters and are very encouraging as to the possibilities of *Chrysothamnus* culture, but they can do nothing on an extensive scale unless there is a general public demand for it. Our American people as a whole are very slow to protect themselves against remote dangers, and since our government workers can get support only when there is some political interest to be served, it remains, it seems to me, for some man or group of men with long vision and strong patriotic impulses to take the initiative in the matter.

Any suggestions which you may care to make or any criticism of our work will be most thankfully received, even though our active studies in *Chrysothamnus* have ceased, at least for a time. We always appreciate the opinions of those who are familiar with the more practical aspects of the situation.

H. M. HALL.

Berkeley, California, May, 1920.

STEVENS' SULPHUR DETERMINATION METHOD.

TO THE EDITOR:

DEAR SIR:—In your issue of March 1, you reprint a paper by Messrs. Kratz, Flower and Coolidge entitled, "A Rapid Method for the Determination of Sulphur in Rubber Mixtures." These authors have been good enough to refer to the method in use in my laboratory for this purpose (see "Analyst," Vol. XLIII, 1918, page 377). I do not lay claim to originality in the use of magnesium nitrate in the place of the ordinary sodium carbonate-potassium nitrate mixture, as magnesium nitrate was recommended some years ago for this purpose (see, for instance, Caspari, "India Rubber, Laboratory Practice"), although its advantages do not appear to have been fully recognized. The only modification I lay claim to is the use of a Kjeldahl flask for the wet oxidation. By fitting this with a single surface condenser in the neck, the contents of the flask may be boiled for some hours without appreciable loss of acid. I do not think the process of transferring the contents to a dish for evaporation and "baking" is an operation likely to involve much trouble or loss, and my process has the advantage of avoiding the use of bromine. This is of importance, because bromine is frequently contaminated with sulphur compounds, whereas the ingredients I use, namely, nitric acid, potassium chlorate and magnesium nitrate, are all obtainable free from sulphur compounds, so that blanks give practically negative results. For those who may not have a copy of "The Analyst" handy I give below an account of the method I employ for carrying out the determination.

About 0.5-gram of the sample is digested with 20 cubic centimeters of nitric acid (specific gravity 1.42), to which about 0.5-gram of potassium chlorate is added. If the sample is finely divided, the initial reaction is violent, and the flask (a Kjeldahl flask is suitable) should be cooled in water. The flask is fitted with a small surface condenser, and the liquid boiled for two or three hours, then evaporated to dryness in a basin, with the addition of 3 grams of pure magnesium nitrate. The heat must be moderated at the last stages to avoid spitting, and finally it is cautiously heated over a naked flame. The slow combustion which takes place owing to the presence of the magnesium salt is quite under control. There is no need to carry the heating farther, and ten or twenty operations can be carried out with the same dish. If an appreciable amount of unburnt carbon remains, it is best destroyed by digesting the nitric acid and a little chlorate, and the excess of acid removed by evaporation. Ten cubic centimeters of concentrated hydrochloric acid are then added, and the dish covered with a clock-glass, and gently heated for an hour or two until red fumes cease to be given off. The liquid is then diluted, filtered, and made up to 300 cubic centimeters, heated to boiling on a hot plate, and precipitated by very gradually adding 5 cubic centimeters of a 10 per cent solution of barium chloride. The whole is allowed to stand over night, and the barium sulphate estimated on the following day in the usual manner.

Numerous duplicate analyses give concordant results, and also agree with estimations made by heating the sample with nitric acid in a sealed tube.

One assistant can easily average 6 sulphur determinations a day by this method.

HENRY P. STEVENS.

15 Borough High Street, London Bridge, S. E. 1.

THE RUBBER SITUATION IN THE PHILIPPINES.

TO THE EDITOR:

DEAR SIR: Many years in the Philippines and a knowledge of the situation there prompts me to summarize the conditions affecting rubber planting.

(A) There are certain tropical agricultural commodities or industries that cannot be developed by a poor man (all Filipinos) without lots of capital, because of the many years' wait for any returns. Chief among these is rubber where catch crops are not practical as in cocoanut production.

(B) The present land and labor laws were formulated by Americans, not by the Filipinos, and cannot be changed without Filipino legislative action approved by the President of the United States. All Filipino action has been consistently blocked by our State Department.

(C) Progressive Filipino planters realized these initial law handicaps years ago, and it is a matter of record that in 1917

the Filipino Agricultural Congress—a semi-official body—came out squarely for a change in the existing immigration laws to permit entrance of labor from outside, but the American power then in control did not help them.

(D) The government changes since the Jones Law went into effect are many:

(1) Philippine Assembly equals our Congress.
Philippine Senate equals our Senate.
Philippine Cabinet equals our Cabinet.
Philippine Council of State equals our Cabinet plus Speakers of both houses with the President presiding.

(2) National budget covering all appropriations based on the English system.

(3) Municipal and government ownership which is efficient and yields profits instead of adding taxes to the people.

(4) A national development company ($25,000,000 capitalization) with 51 per cent of stock government, and 49 per cent public, administered by business men, to develop the latent resources of the Islands by subsidiary companies.

(5) They have a Philippine commercial agency in the States with offices now in San Francisco and New York. I understand J. J. Rafferty has just been named Philippine Trade Commissioner for the United States. (It is on this that you can make a hit that should count—that unless the Philippine officials can change their laws to permit rubber development on a business basis [large leased land areas and cheaper and plentiful imported labor]—they had better stop trying to interest rubber investment altogether. This may get action.)

(E) The patriotism of the Filipino people in organizing a division for use at the front, their efficient government organization from a practical operating view-point, their foresighted public works development, their appreciation of the work done by Americans in giving a gratuity (above all contractual obligations) to Americans who have served faithfully and well, are the creditable things that may be referred to—the sugar for the beginning and the ending of your article.

Faithfully,

Manila, P. I., 1920. C. F. H.

OF PIONEER STOCK.

TO THE EDITOR:

DEAR SIR: To introduce my sister and myself, allow me to mention that our father, L. Otto P. Meyer, a naturalized American, was well known in the rubber world. In former years you sometimes bought short articles about his inventions, as in No. 5 of your paper of the year 1894, February 15, page 133.

Our father died at the age of 88 years. Although his patents, the employment of tin-foil and tin molds, as also the improved process of the water-hardening, afforded the American manufacturer the only effective protection for 21 years, and even today form the basis for the manufacture of vulcanite, he died in very poor circumstances, leaving a widow in delicate health, who also died a few years ago, and we, his two maiden daughters, both artists (lady painters). Our father told us shortly before his death, "If ever in life you should need the help of a friend, I am sure that among my American rubber friends there will be some one who will aid you." I am not aware who of my father's friends or acquaintances are still alive; I therefore address these lines to you.

We are both born Americans, painters by vocation, and, although we have lived here many years, we are generally treated by the Germans as foreigners, which makes it more difficult for us to earn money. We therefore would be happy if we could sell some pictures in America. We have at hand originals and good copies of the Dresden Gallery. As the German money stands very low, it would be for American purchasers a good bargain.

Please excuse my troubling you, but the terrible times we have gone through have induced us to apply across the ocean for help and we would be very happy if we could receive an order from you.

Yours respectfully,

Ostbahn Strasse, 8, III, EDA MEYER.
Dresden, April 4 1920.

WHY NOT AMERICAN RUBBER FACTORIES IN MALAYSIA?

TO THE EDITOR:

DEAR SIR:—With America importing thousands of tons of rubber a year—one company alone is using 35,000 tons—it would seem worth while for more American rubber manufacturers to built plants in eastern countries. The principal sources of supply are Singapore and Malaysia and in order to furnish the needs of the United States, vast industries have grown up in these countries. What was formerly a mere jungle is to-day a busy center of industry. The distance between the source of supply and the American manufacturer is so great that much time and money is lost in the process of transportation. Cheap coolie labor in China is another factor which would enable the American manufacturer to turn out rubber goods at a much lower price were the rubber grown on American plantations in the Orient.

Representatives of the Interchurch World Movement who are making an economic survey of the East report that native Chinese are making fortunes in Malaysia, through the demand of the United States for the raw material. Sons of coolies, who went to the Straits a generation ago to work on the plantations are to-day owners of rich holdings and the chief business men of the place. The English Government offered five acres each to coolies who would agree to cultivate the jungles. In consequent great centers of civilization have sprung up where formerly only wild animals were to be found. The rubber plantation yields a big profit for the energy expended upon it.

INTERCHURCH WORLD MOVEMENT OF NORTH AMERICA,
45 West 18th street, New York City.

AS TO RUBBER HEEL PATENTS.

TO THE EDITOR:

DEAR SIR: Are there any patents covering the use of a concave surface for the portion of a rubber heel that attaches to the shoe? If so, will you be good enough to cite them for me?

Los Angeles, March 10, 1920. P. A. MCAVINY.

Heel patents in general run into thousands. To scan them all would be something of a task. Of course there are the Trufford patents that are suggested by your question. Then, too, as far back as 1897 the idea of recessed heels was indulged. Witness the pneumatic heel brought out by Anderson of Boston. There was also the Spider-grip heel, made with a rand so it could be attached directly to the heel-seat by a heeling machine. There was, furthermore, the Ferguson heel that, to quote the printed description, had "a sort of hollow or air-chamber next to the shoe which causes the rubber heel to adhere to the leather, on the same principle of suction which enables a fly to keep its footing on a ceiling or wall.

You might look up the following also:

1896.	Anderson ..... No.	582,336	1900.	Herbst ..... No.	658,441
1897.	Warner	594,108	1902.	Hilton	736,394
1897.	Hanline	615,167	1904.	Hammer	817,355
1898.	Morrow	623,803	1906.	Kearney	866,867
1899.	Morrow	630,726	1906.	Anderson	869,764
1899.	Ferguson	638,228	1907.	Leighton	906,807

There are many others, as this is by no means an attempt at a complete list. THE EDITOR.

What the Rubber Chemists Are Doing.

CARBON BLACK.[1]

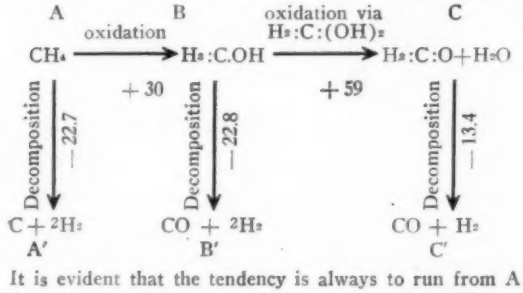
METHOD OF MANUFACTURE.

CARBON BLACK, as known to the American trade, is the fluffy, velvety black pigment produced by burning natural gas with a smoky flame against a metal surface. It is entirely different in physical characteristics from lampblack, which is made by burning oil or other carbonaceous material with insufficient air for complete combustion and collecting the smoke in settling chambers. Lampblack is gray in contrast to the deep black of carbon black, and often contains considerable quantities of empyreumatic matter.

The process of manufacture used to the greatest extent at the present time is the so-called channel system, in which the black is deposited on the smooth under-surface of steel channels by lava-tip burners set at a distance of three or four inches below the channel. The channel irons are usually built up in tables of eight, sometimes 100 feet long, and are given a slow reciprocating motion which scrapes the black deposited on them into hoppers from which it is carried by screw conveyors to the packing house, where it is bolted and sacked. The mechanism is enclosed in sheet-iron buildings in order that the amount of air may be regulated. Varying the amount of air, speed of scraping, and pressure of the gas controls the quality of the product. The shape of the burner and distance from the collecting surface also affects the quality of the black, but these are constant for any one plant. Other similar processes differ only in the nature of the collecting surface and burners.

THEORY OF FORMATION OF CARBON BLACK.

When natural gas burns in an incomplete supply of air, the carbon is liberated, not as a result of preferential combustion of hydrogen, but as a direct decomposition of unburned gas in the heat of the flame. According to Bone[2] and co-workers, combustion takes place in steps as a result of hydroxylation:



It is evident that the tendency is always to run from A to C. When the proportion of methane to oxygen is CH_4: O_2 the reaction goes from A to B to C to C'. If the ratio is 2 CH_4: O_2 or higher, only a part of the methane can be oxidized through the reaction A to C and part is decomposed at A by the heat evolved in the A to C reaction. The lowest per cent of oxygen in which a methane flame will burn is 15.6 per cent. Carbon will be evolved only in the inner part of the flame, where the oxygen supply is low but where there is sufficient heat to break up the methane, and the per cent of carbon to be expected by the incomplete combustion of methane is low. Gases rich in ethane and the higher homologs produce greater yields by this process.

The function of the cold surface is to cool the liberated carbon in the flame sufficiently to prevent its combustion. This permits the use of a sufficiently hot flame to give carbon uncontaminated with hydrocarbons or their partial oxidation products and produces a finely divided material which has been prevented from agglomerating by the sudden cooling. It is evident that there must be an optimum temperature and an optimum position for the surface in the flame. Too cold a surface may prevent the maximum separation of carbon; too hot a surface will allow too much carbon to be burned and may change the properties of the carbon which remains unburned. The temperature of the channels in the present processes is about 300 degrees C.

USES OF CARBON BLACK.

In order of importance the uses of carbon black are as follows:

1—Printers' ink.
2—Automobile tires and other rubber goods.
3—Black and gray paint and enamel.
4—Stove polish.
5—Other products—such as phonograph records, carbon paper, crayons, typewriter ribbons, black and gray paper, glazed paper, tarpaulins, black leather, bookbinders' board, marking and stenciling inks, rubber sheeting and clothing, hard rubber, artificial stone and black tile, Chinese and India inks, fireworks, insulating materials, crucible steel, case hardening.

The amounts used by these industries in 1918 were approximately as follows:

	Pounds.
Printers' ink	10,000,000–12,000,000
Rubber goods	20,000,000–
Stove polish	4,000,000– 5,000,000
All others	1,000,000–

Besides this, in normal times probably 15,000,000 pounds are exported.

RUBBER TIRES.

Prior to 1914 little carbon black was used by the rubber industry and then only in small amounts as a coloring material. Little distinction was made between carbon black and lampblack, the two compounds being used indiscriminately. At this time, due partly to the stimulus afforded by the rising price of zinc oxide, it was found that carbon black could be used in very large amounts as a filler for rubber, with a correspondingly smaller amount of zinc oxide. Carbon black is used in rubber in quantities of 3 per cent to 20 per cent by weight. Many manufacturers claim very unusual properties for rubber so compounded. It is said to increase the tensile strength very greatly and to give increased toughness and resistance to abrasion. It is believed by some authorities that the life of the rubber is increased. Other rubber chemists are more conservative in their praises of carbon black and do not admit that it possesses any properties which make it irreplaceable.

From the point of view of cost, carbon black is much cheaper than zinc oxide. Carbon black, absolute specific gravity 1.8, suitable for compounding in rubber, can be procured for as low as 10 cents a pound at the present time. Zinc oxide costs at least as much and has a specific gravity of 5.8. Carbon black evidently costs one-third as much as zinc oxide on a volume basis, supposing that equal volumes were compounded with the rubber, but in practice a greater volume of carbon black is used than of zinc oxide so that the resulting mix with carbon black contains less rubber per unit volume than the corresponding zinc oxide mix.

From a theoretical consideration, carbon black should be an ideal filler for rubber on account of its extremely fine state of division and the correspondingly large surface energy developed when intimately mixed with the rubber. It also serves to

[1] "Carbon Black, Its Properties and Uses." By G. St. J. Perrott and Reinhardt Thiessen, Chemical Research Laboratory, Bureau of Mines Experimentation, Pittsburgh, Pennsylvania. Presented at the meeting of the American Chemical Society, Philadelphia Pennsylvania, September 2 to 6, 1919. Published by courtesy of the American Chemical Society.

[2] Transactions of the Royal Society, London, 215 (1915), 275.

protect the rubber substance from the effects of light and may possibly retard oxidation.

Whatever may be the true state of affairs as to the irreplaceability of carbon black in rubber, an enormous amount is now consumed by the rubber companies, probably 20,000,000 pounds annually, and 10,000,000 pounds exported for foreign trade in normal times.

TESTING METHODS.

The final test of the suitability of a black for a given purpose is the actual trying out of the working qualities. In rubber making a sample mix is made and the finished piece tested for tensile strength, per cent elongation, toughness, and resistance to abrasion.

There are, however, a number of laboratory tests which are of use in matching a standard sample. The tests most commonly employed are for tinting strength, color, and grit. It is also desirable to determine moisture, ash, and acetone extract.

TINTING STRENGTH.

According to the American Society for Testing Materials, tinting strength is "the power of coloring a given quantity of paint or pigment selected as a medium or standard for estimating such power." Tinting strength, then, as applied to carbon blacks is the measure of the ability of the black to impart a color to a definite weight of standard white. It depends on the size of the particles and the specific gravity of the black. In making the test, the black is always compared with a standard black.

Weigh out accurately an a sensitive balance, 0.100-gram of the black to be tested and 10.0 grams of a standard zinc white kept especially for the purpose. Transfer to a glass or marble slab and add from a burette exactly 3.5 cc. refined linseed oil. Mix with a palette knife and rub out thoroughly with the palette knife (or, better, a glass muller) until no streakiness or difference of color is observed, when successive small portions are spread out on a clean piece of window glass and viewed from the upper side. It is important that the rubbing out be thorough; 10 minutes are usually sufficient. Follow the same procedure with the standard black. Then spread a small amount of each mix side by side on a clean glass (a microscope object glass serves the purpose very nicely). Examination of the samples from the other side of the glass, particularly at the line where they overlap, will show the difference in tinting strength.

To make a quantitative estimation of the tinting strength of the sample as compared to the standard, more white is added to the stronger mix until the colors match. A new sample of the stronger black is then weighed out, using the calculated amount of zinc white, and the process repeated until mixes of the same color are obtained. If, for example, it was necessary to mix 15 grams of zinc white with 0.1-gram of the standard to match a mixture of 10 grams zinc white and 0.1-gram of the sample, the latter has two-thirds the strength of the standard.

COLOR.

By this term is meant the relative blackness of the material when mixed in oil.

To 0.3 gram of each of the blacks to be compared add 1.3 cc. of refined linseed oil from a burette. Mix thoroughly with the palette knife and spread side by side on a slip of glass and compare the relative color by viewing from the upper side of the glass.

GRIT.

Presence of gritty matter is determined by rubbing a portion of the black under the finger or by placing a small amount on the tongue and rubbing between the tongue and palate.

CHEMICAL TESTS.

It is occasionally desirable to make a few quantitative chemical tests of carbon black. A black containing more than 0.2 per cent ash is probably adulterated with mineral black or charcoal. An acetone extract over 0.1 per cent indicates adulteration with a poorly calcined lampblack. Too great a percentage of moisture is undesirable from the point of view of working qualities. Certain blacks will absorb as much as 15 per cent of their weight of moisture, making a total moisture content of 20 per cent or more. More blacks for ink making contain from 2 to 4 per cent of moisture, although certain blacks may contain as high as 7 per cent.

MOISTURE.[3] A 1-gram sample of the black is placed in a weighed porcelain crucible and heated for one hour at 105 degrees C. in a constant temperature oven in circulating dry air. The crucible is then removed from the oven, covered, and cooled in a desiccator over sulphuric acid. The loss in weight multiplied by 100 is recorded as the percentage of moisture.

ASH.[3] The crucible containing the residue from the moisture determination is heated gradually with a Meker burner (for better, in a muffle furnace) to cherry-red (about 750 degrees C.). Ignition is continued until all the particles of carbon have disappeared. The crucible is then cooled in a desiccator and weighed, after which it is heated again for 15 minutes, cooled in a desiccator, and reweighed. If the change in weight is more than 0.0002-gram, the process is repeated until successive weighings are constant to this figure. The weight of the crucible and ash minus the weight of the crucible is taken as the weight of the ash.

ACETONE EXTRACT. A 2-gram sample is weighed into an alundum or paper extraction thimble of 20 cc. capacity and the extraction carried out for one hour, using any standard apparatus of the Soxhlet type. The weight of the residue after evaporation of the acetone is taken as the acetone extract. The extract for a pure carbon black is usually zero.

SPECIFICATIONS.

The Bureau has received a great many inquiries in regard to tests which a carbon black must meet to be suitable for use in printing ink or rubber.

The following specification represents the requirements for the rubber trade. It should be realized that there are no hard and fast specifications for carbon black, and that the test on which a black stands or falls is the practical test.

CARBON BLACK FOR RUBBER COMPOUNDING.

CHEMICAL TESTS.

Moisture—Less than 4 per cent.
Acetone Extract—Less than 0.5 per cent.
Ash—Less than 0.25 per cent.

PHYSICAL TESTS.

Grit—None.
Tinting Strength—Not less than 90 per cent of the strength of standard.

PRACTICAL TESTS.

Rubber mixes are made up containing equal weight of the sample to be tested and of the standard. Mixes are cured under exactly the same conditions. The finished sheet is tested for tensile strength, per cent elongation, toughness, and resistance to abrasion.

CHEMICAL ANALYSIS.

Carbon blacks consist of from 85 per cent to 95 per cent amorphous carbon, 1 per cent to 7 per cent water, 0.5 per cent to 0.8 per cent hydrogen, and from 2 per cent to 8 per cent oxygen, present partly as CO and CO_2, and partly as fixed oxygen.

[3] For details of method, see F. M. Stanton and A. C. Fieldner, "Methods for Analyzing Coal and Coke," Bureau of Mines, Technical Paper 8.

BENZOL POISONING.

Benzol or benzene is one of the most important industrial poisons. Poisoning due to benzene may occur in the manufacture of aromatic hydrocarbons, or in the technical use of products containing these hydrocarbons, for example, in the removal of grease from goods, and in the manufacture of varnish and rubber. The poisoning may be mild or severe, acute or chronic, and may have fatal results. When man is exposed to a mixture of benzene and air, he absorbs 80 per cent of the ben-

zene; the limit for animals is from 0.015 to 0.016-part of benzene to 1,000 parts of air. Distillations should be carried out in impervious apparatus with well-cooled condensers. All apparatus which has contained benzene should never be entered for cleaning or repairs until all benzene has been removed, and thorough ventilation has occurred. The workmen should have approved breathing apparatus. A person overcome by benzene should be removed into fresh air promptly, and given artificial respiration. Women are more susceptible than men to benzene poisoning. (R. P. Albaugh, "Modern Medicine," 1919, volume 1, page 670.)

CHEMICAL PATENTS.

THE UNITED STATES.

LEATHER SUBSTITUTE, comprising rubber and wax of the montan class. The composition has the tough slow-flexing qualities of leather and is devoid of the springy, elastic qualities of rubber. (John D. Prince, Boston, Massachusetts. United States patent No. 1,336,858.)

DRESSING FOR LEATHER, ETC. A quick drying dressing for leather and the like, consisting of the following ingredients in the proportions stated: asphaltum, 1 gallon; benzine, 1 gallon; rubber cement, 1 quart; black pigment, 1 pound; Japan drier, 1 pint; beeswax, ¼ pound. (Alfred R. Caldwell, Pasadena, California. United States patent No. 1,338,286.)

THE UNITED KINGDOM.

ELECTRIC CABLE COMPOSITION.—For a protective and insulating covering, rigid when cold, but readily pliable when warmed, which permits the cable to be laid against irregular surfaces by heating it at the necessary parts. It comprises rubber combined with a large proportion of sulphur to which may also be added asbestos, shellac, gutta percha, balata, silica, magnesia, chalk, zinc oxide and the sulphates of antimony. When applied to the cable the composition is vulcanized to produce a covering of the nature of ebonite. The following percentage proportions are given: rubber 35, reclaimed rubber 15, rubber substitute 5, ebonite dust 10, silica 10, magnesia 10, and sulphur 15. (T. S. Seymour, 20 Mount Carmel, Derby, and St. Helens Cable & Rubber Co., Arpley, Warrington, England. British patent No. 139,226.)

AUSTRALIA.

PRESERVING INDIA RUBBER.—To prevent the oxidation of rubber goods, the enzymes are destroyed by the application of a 10 per cent solution of ammonia containing about 0.3 per cent of a saponaceous substance such as sodium oleate, laurate and cresylic acid, carbonic acid or other antiseptic substance which will not precipitate the soapy material. The solution is applied to the latex, or to flexible rubber goods by immersion or by repeated superficial application. (F. E. Stowe, New South Wales. Australian patent No. 3,364.)

RECLAIMED RUBBER. Process for recovering rubber from waste. (Acushnet Process Co., assignee of T. F. Furness, Pennsylvania, and P. E. Young, Massachusetts, inventors. Australian patent No. 11,970.)

THE FRENCH REPUBLIC.

RECLAIMED RUBBER. Process for recovering rubber and cotton from waste. (Acushnet Process Co., Inc. French patent No. 501,214.)

GERMANY.

RECLAIMED RUBBER. Process for reclaiming rubber from soft, elastic, and tensile vulcanized goods. (Farbenfabriken, formerly Friedrich Bayer & Co., Leverkusen, near Köln am Rhein. German patent No. 303,984 "K.")

RECLAIMED RUBBER. Process for reclaiming rubber from vulcanized substances, having great stretching qualities, firmness, and elasticity. (Farbenfabriken, formerly Friedrich Bayer & Co., Leverkusen, near Köln am Rhein. German patent No. 305,667 "K.")

LABORATORY APPARATUS.

LABORATORY BURNER.

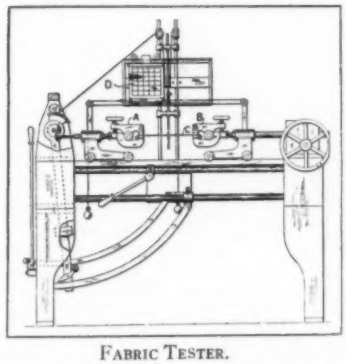
A NEW FORM of burner for laboratory use is that known as the "Fisher." Although but recently introduced it is rapidly finding favor with chemists.

It is provided with perforated nickel grid for hot flame and brass cap for Bunsen flame, thus combining the features of two burners in one. It will produce a flame 1¼ inches in diameter, all of which is hotter than the hot tip of a Bunsen flame, or it can be adjusted to give a clear Bunsen flame, 7/16 inches in diameter. It will burn any gas except acetylene. (Scientific Materials Co., Pittsburgh, Pennsylvania.)

THE FISHER BURNER.

AUTOGRAPHIC FABRIC TESTING MACHINE.

A fecently patented autographic fabric testing device, as shown in the illustration, consists of a horizontal fabric testing machine and a chart holding mechanism. The latter is appropriately connected by means of lever and cord and pulley attachments with the grips A, B, holding the fabric test sample C. The frame carrying the chart is thus made to move horizontally in fixed relation to the strain upon the fabric, and vertically in accordance with the elongation of the fabric. Thus, a curve may be traced on the chart D by a suitable marker which will record the relations of tensile strength and elongation of the specimen under test. (Alfred E. Jury, Newark, New Jersey, assignor to the United States Tire Co., New York City. United States patent No. 1,327,393.)

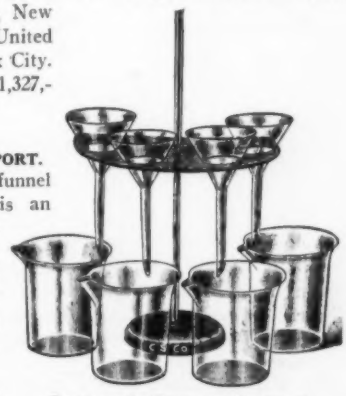


FABRIC TESTER.

ALUMINUM FUNNEL SUPPORT.

Stoddard's aluminum funnel support here illustrated is an improvement over the usual clumsy, wooden, two-funnel support. It is arranged for the use of four two-inch or two and one-half inch funnels within a small space.

The stand is clean, neat and not easily corroded. (Central Scientific Co., 460 East Ohio street, Chicago, Ill.)

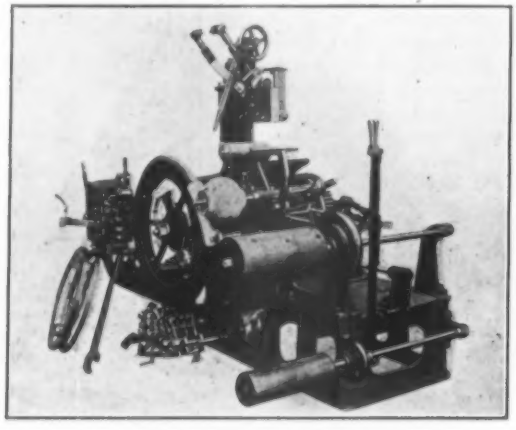


STODDARD'S FUNNEL SUPPORT.

New Machines and Appliances.

THE MATHERN TIRE MAKING MACHINE.

ALTHOUGH European manufacturers are familiar with the pneumatic tire-building machine here shown, it is not generally known in this country. For fourteen years it has been in use abroad where 450 machines are successfully operating. The machine possesses many admirable features to recommend it, particularly to the smaller tire manufacturers. It will be remembered that this machine was a silent, yet important witness, in the litigation recorded in THE INDIA RUBBER WORLD, January 1, 1919, concerning basic tire machine patents.



THE MATHERN TIRE BUILDER.

A salient feature is the automatic building of the carcass from a continuous fabric strip, and without stopping the machine, thereby insuring regularity of stretch. The strips of frictioned fabric are delivered to the core from the fabric roller located in front of the tension drum and the liner is wound up on the roller beneath. The plies are rolled down by a series of stitcher rollers mounted on levers contained in a roll-box which, when adjusted to the core, automatically completes the rolling-down operation. Positive tension is obtained by a small convex drum, positioned between the fabric roller and the core, and correctly proportioned to the size of tire under construction. Located between this drum and the core is the bridge for guiding the fabric.

There are two bead rings; one is placed behind the core and the other in front, being provided with pins and hooks which insure centering of the beads. The bead rollers are mounted on a pivoted hinge that brings them in position over the core when required and removes them when the bead setting is accomplished. When all the plies are laid under and over the beads the canvas edges are accurately trimmed by a special cutting device.

All sizes of tires from 2½ to 5 inches can be built on this machine by changing a few accessories, and 80 tires per day of 10 hours may be produced by an operator of ordinary skill. (A. Mathern, Zollikow-Zurich, Switzerland. L. J. Broche, 889 Stutz street, Akron, Ohio, United States agent.)

SOLVENT RECOVERY SYSTEM.

The recovery of inflammable and explosive solvents largely used in the rubber industry is interesting because of the increasing cost and the possible diminution in the supply of solvent naphtha. As the demand for cord tires continues unabated, the consumption of impregnated fabric will increase accordingly and result in a greater demand for spreader solvent, therefore, the following description of a method for saving solvent is timely:

In this system no oxygen comes into contact with the solvent vapors and therefore there is obviously no possibility of fire or explosion. This is accomplished by enclosing the entire operation in a gas-proof housing and circulating within the housing flue gas which is composed almost entirely of nitrogen and carbon dioxide. Moreover, the method is not limited by physical conditions, for the relation of the solvent vapors to the drying gases can be made to suit the best drying conditions, and, due to the lack of danger in handling the vapors, it is possible to manipulate them in such a way as to obtain maximum recovery.

The impregnation or spreading operation is continuous as it is possible to sew a new roll of fabric to the one being impregnated. There is no danger in stopping and starting the machine. To get the machine into operation flue gas is forced through the cycle until all the air is swept out. When it is necessary to discontinue operation the flow of flue gas is maintained until all of the solvent has been swept from the system, when air is substituted, thus making it possible to open up the machinery for the cleaning operations which are always necessary in impregnating and spreading.

For small manufacturers of cord tires an impregnator is recommended that will give a maximum production of 900 square yards of cord fabric per hour. As soon as the plant is using 100 gallons of solvent per day the recovery plant should be attached to this impregnator. The recovery plant furnished for this production is such that with the substitution of a larger compressor and condenser it may be arranged to take care of any amount of solvent up to the maximum capacity of the impregnator.

Referring to the illustration, flue gas from the two producers, 2, 2, after being cooled and washed in 3 and 4A, is passed into the impregnator housing 5. The resulting mixture of flue gas and solvent vapor is drawn out of this housing and passed through the forecooler 8A, at approximately atmospheric pressure. It is then compressed and passed through the intercooler 8H. It

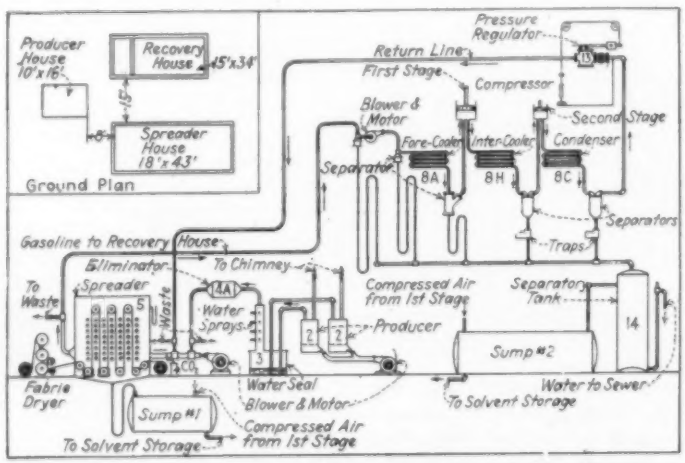


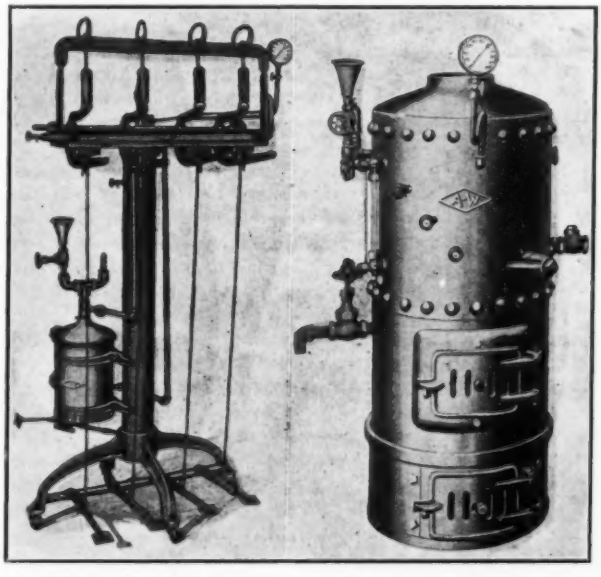
DIAGRAM SHOWING OPERATION OF THE LEWIS SOLVENT RECOVERY SYSTEM.

is then further compressed and passed into the condenser 8C.

The solvent condensed out in these three coolers is drawn off by gravity to a separation tank 14 where it is separated from any accumulated water, and the residual inert gas reduced to approximately atmospheric pressure by 13 is passed back into the impregnator housing. The system is thus essentially a complete cycle, except as additional flue gas is added to replace losses that must necessarily occur. (Lewis Recovery Corporation, Room 1206, 68 Devonshire street, Boston, Massachusetts.)

AKRON-WILLIAMS TIRE REPAIR NOVELTIES.

Tire repairing as a business will attain a greater development in direct proportion to the energy exercised in building better repairs. That progress is constantly being made in the development of tire repair equipment, to the convenience and economy of repairmen, is shown in the accompanying illustration. On the left is an inverted tube vulcanizer, unique in its adaptation of a principle giving greater efficiency and ease of manipulation. The tube hangs down away from the heat during the cure. The



INVERTED TUBE VULCANIZER. UNIVERSAL BOILER.

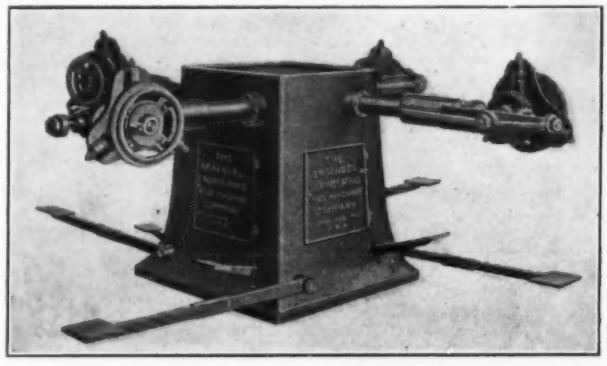
pressure bars are controlled by foot-pedals enabling the repairman to have both hands free to adjust tube on the hot plate. A feature of construction, when this outfit is built to use gasoline as fuel, permits it to be pushed about the garage or repair shop floor at the convenience of the operator.

The special one-and-one-half horse-power boiler or generator shown in the illustration on the right is of vertical tubular type and of steel construction throughout. It is readily convertible from gas or gasoline burning to coal or coke burning with the addition of a small section which fits to the bottom of the boiler unit. This boiler has a very low water line, permitting a gravity return from the vulcanizing units without necessitating the placing of the boiler in the basement or on the next lower floor. (The Williams Foundry & Machine Co., Akron, Ohio.)

CHAMPION TIRE BUILDING STANDS.

Spinning the tire with one hand and using the various tools with the other is eliminated in this machine as the operator has both hands free and can revolve the tire either forward or reverse, at any speed and at any angle, by operating a foot-lever.

These stands are made in three different types. The one shown in the illustration is the base with four projecting arms, enabling four men to work at the stand. The second is the



FOUR-MAN BUILDING STAND.

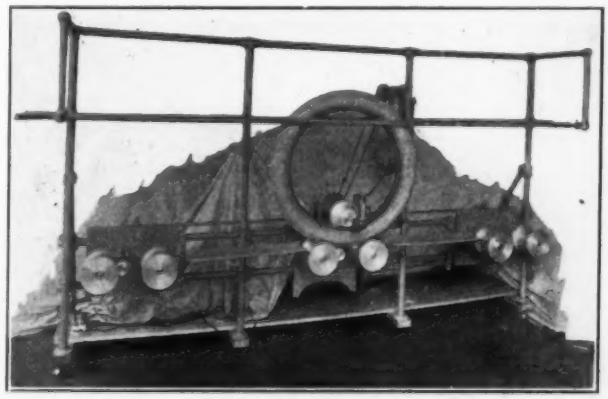
base with two arms parallel with each other, enabling two men to work at the same stand; and the third is the single stand for one man.

The four-man base can be sold with one arm and other arms can always be added as the manufacturer requires them. There are ball bearings on both the main drive shafts, thereby making the machines noiseless and easy to run. (The Braendel Engineering & Machine Co., 724 Dearborn street, Louisville, Kentucky.)

MACHINE FOR COATING INSIDE OF CASINGS.

The problem of coating the inside surface of casings with a preparation so that the casing and tube will not adhere, has been solved by the machine here pictured. After a long period of satisfactory service, and after basic patents have been granted, it is now being brought to the attention of the trade.

The outstanding features of the machine are speed of operation and simplicity. From six to ten tires per minute are lined evenly from bead to bead, and without wasting the liquid, thereby saving at least two-thirds of it as compared with the present hand-swabbing method. Three tires are rotated at a time in a vertical position on drums driven by a small electric motor. The beads of the center tire are held apart by a dished wheel having an operating handle. This permits the spraying device,



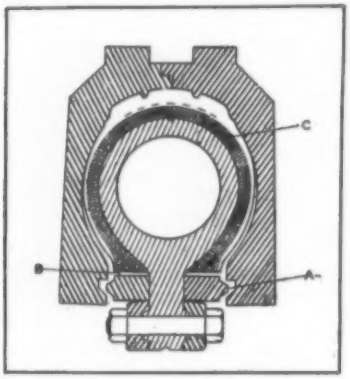
TIRE LINING MACHINE.

which is attached to the handle, to evenly coat the inside of the tire as it revolves. The drum on the left supports the casing to be lined, while that on the right is being rotated to dry the coated casing.

When the center tire has made one revolution, the operator throws up the handle, which stops the spraying and causes all three tires to roll towards the right, thus placing another shoe in position to be coated, and rolling the finished tire into the wrapping room. The complete machine is 7 feet high and occupies a floor space 4 by 12 feet, and may be operated by a girl or one-armed man. (The O. Hammel Co., 209-213 Fourth avenue, Pittsburgh, Pennsylvania.)

S. & B. FLEXIBLE STEEL MOLDS.

Flexible steel molds for making straight-side or clincher tires by the full molded process are said to have fully demonstrated all claims made by the manufacturer.



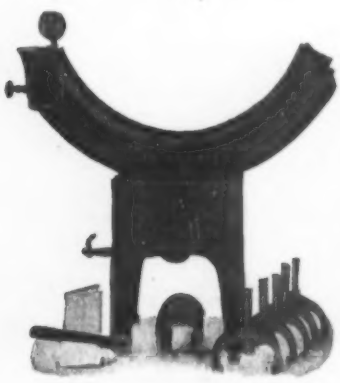
FLEXIBLE STRAIGHT-SIDE MOLD.

The curing of either fabric or cord tires on solid collapsible cores is made easy. Each half of the mold is provided with saw cuts to allow contraction of the inner diameter of the mold. Each half is dished and made to come together at the tread first, then by applying pressure the mold is closed gradually and progressively toward the beads, forcing the air and excess rubber ahead of the contact points, stretching the fabric also and finally landing the surplus rubber into the overflow cavity A, while all harmful movements of stock toward the tread are eliminated.

By this process it is possible to use beads of larger diameter than those generally used, leaving more space at B, and more room for contraction of bead diameters, which allows more stretch to the sides of the tire carcass during vulcanization. Before placing the tire in the molds, beads and sides of tire are pulled loose from the core to the tread line C, leaving the tread portion cemented to core. (Swinehart & Byrider Process Co., 212 Second National Building, Akron, Ohio.)

HIGH PRESSURE SECTIONAL VULCANIZER.

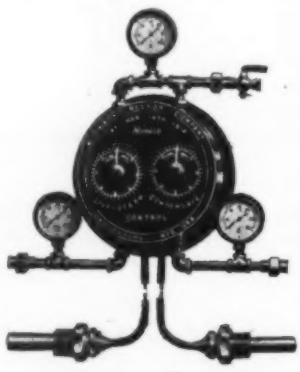
An improvement over the old-style kettle, or wrapped process, is claimed for the Soper high-pressure retreading machines and sectional molds. Among the advantages noted are: wood fiber marking blocks that keep the rubber from overflowing; semi-cure, keeping the rubber from overcuring on lap, which often causes a weak spot on the retread; no matrix to break, as the ribs are cut in the mold; inclosed fire-box, giving four times the heating surface found in ordinary molds and making steaming up 50 pounds possible in 20 to 25 minutes; hand-forged clamps that are practically unbreakable.


THE SOPER RETREADER.

The vulcanizers have self-contained gas-heated boilers, although kerosene burners can be supplied if desired; and they are made in six types, suitable for the smallest oil station or the most completely equipped retread shop. (Soper Vulcanizer Manufacturing Co., 110 East Eleventh street, Los Angeles, California.)

HONECO VULCANIZER TEMPERATURE CONTROLLER.

In this device two controlling systems are compactly combined in one casing, one system to control the inlet steam for maintaining the temperature in a vulcanizer, tire press, retort or any closed space, and the other to control the discharge of condensation and wet steam from the same apparatus. While this combination of two controlling systems in one casing is not new, however, the systems themselves are novel, and interesting.

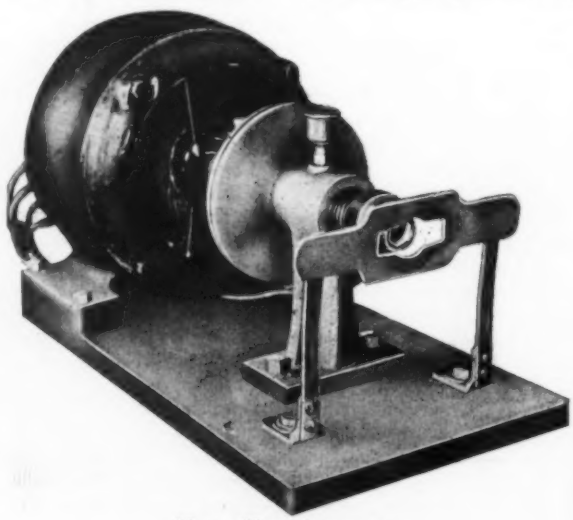

AIR-OPERATED CONTROLLER.

There are no fulcrums and levers that require delicate bearings and accurate adjustment and alinement. A valve is located within the adjusting plug, and the latter projects through the front of the casing, permitting the removal of the valve, without the necessity of removing the casing or loosening any connection for adjustment of the air-plug.

The air valve is the most important part of the operating mechanism of any air-operated controller. The Honeco valve is held against its seat by the tension or compression of the spring and is lifted by the expanding capsular diaphragm when inflated by the pressure actuating it. The upward movement of the diaphragm prevents the valve freezing to its seat because of gumming or corrosion. The adjustment or setting is made with a small wrench and as the entire valve is turned, there can be no change of temperature or pressure while adjustment is being made. (Hohman-Nelson Co., Eau Claire, Wisconsin.)

INNER TUBE VALVE NUT TIGHTENER.

The simple but important process of running up the valve nut on the stem of an automobile tire valve is speedily and securely


VALVE NUT TIGHTENER.

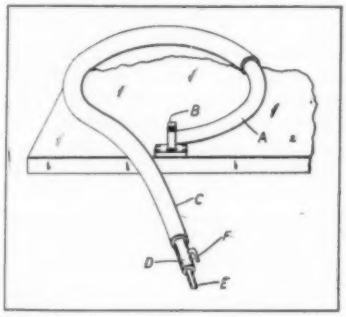
done by various devices, one of which is shown in the accompanying illustration.

In this machine a small electric motor rotates a direct-connected hollow spindle, the entrance to which forms a socket wrench for the reception of the valve nut. In front, a suitable guard is placed which serves as a support against which the operator holds the inner tube and valve base during the tightening process. There is a special clutch with a spring attachment designed to eliminate any danger of the tube catching and turning around while the operator is holding it. (Gillette Rubber Co., Eau Claire, Wis.)

MACHINERY PATENTS.

MANDREL FOR TIRE TUBES.

A DISCONTINUOUS torus-shaped sheet metal mandrel *A* for forming and curing forced inner tubes is shown in the illustration, together with a suitable bench bracket device *B*, supporting the mandrel for the application and removal of the tube *C*, assisted by compressed air.



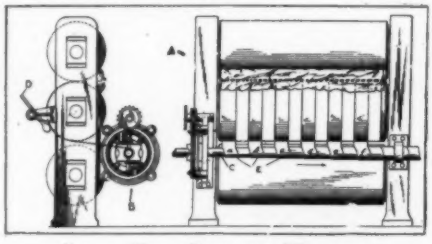
CURING MANDREL FOR INNER TUBES.

The entrance of the air for inflation is effected through a nozzle *D* attached to a hose *E* and controlled by a suitable valve *F*. (Don A. Clark and Clyde E. Lowe, assignors to the Republic Tool & Manufacturing Co., all of Cleveland, Ohio. United States Patent No. 1,330,785.)

MACHINE FOR MAKING INNER TUBES.

Inner tubes are built up from strips of rubber stock delivered directly from the calender roll and wound on mandrels that are continuously fed in a line parallel to the calender.

A represents a 3-roll calender on which is mounted the mechanism *B* for rotating the mandrels *C* and simultaneously moving them parallel to the calender rolls. The mandrels are constructed so that they can be detachably joined in longitudinal alinement. The strip cutting knives are shown at *D*, and at *E* the strips of rubber stock.



INNER TUBE BUILDING MACHINE.

In starting the winding the strip indicated at (*a*) is wound on the mandrel to form the inner layer or lamination; the strip indicated at (*b*) is wound on the first layer to lap the convolutions of the strip (*a*), and then the strips (*c*), (*d*), (*e*) and (*f*) are successively wound on each other to have succeeding strips overlap the convolutions of preceding strips and to form the layers or laminations of material. Thus, after starting the winding on the first mandrel, the winding of subsequent layers to form a tubular covering on a series of detachably connected mandrels can be continuously performed.

After the strips of material have been wound on the mandrels, the material is cut transversely at the junction of adjacent mandrels, and the separate mandrels with the material thereon are prepared for vulcanization in the usual manner. (William C. Tyler, Racine, Wisconsin, assignor to The Goodyear Tire & Rubber Co., Akron, Ohio. United States patent No. 1,332,774.)

OTHER MACHINERY PATENTS.

THE UNITED STATES.

NO 1,337,536. Apparatus and process for treating rubber. E. A. Wullenweber, assignor to Morgan & Wright—both of Detroit, Mich.
1,337,631. Repair vulcanizer. A. B. Zwebell, Milwaukee, Wis.
1,337,707. Pneumatic air-bag core for use in repairing tires. A. L. Johnson and A. O. Alsten, assignors of ¼ each to H. C. Goulding and J. A. Alsten—all of Worcester, Mass.
1,337,910. Expansible core for tires. C. Holm, Bowman, N. D.
1,337,930. Mold for inner tubes. D. Lowe, Akron, O.
1,338,233. Repair die for vulcanizing anti-skid tire treads. O. L. McCormick, Birmingham, Ala.
1,338,407. Tire building machine. E. G. Templeton, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.
1,338,470. Machine for forming battery jars. J. H. Wagenhorst, Akron, O.
1,338,569. Inner tube vulcanizer. E. D. Hostler, assignor of ½ to Hamiel & Mather, partners—all of Tipton, Ia.
1,338,844. Device for stacking tire molds. B. H. Rose, Lakewood, O.
1,339,151. Repair vulcanizer. G. S. Andrus, Akron, O.

REISSUES.

14,852. Apparatus for retreading tires. Original No. 1,327,307. R. A. Brooks, assignor to Western Tire & Rubber Co., a copartnership—both of Chicago, Ill.

THE DOMINION OF CANADA.

198,875. Tire tread constructor. J. A. Thomas and E. J. Usher, co-inventors—both of Toronto, Ont.
199,071. Tire-wrapping machine. The Pierce Wrapping Machine Co., assignee of F. M. Pierce—both of Chicago, Ill., U. S. A.
199,214. Apparatus for manufacturing solid rubber tires. The Dunlop Rubber Co., Westminster, County of London, assignee of C. Macbeth and E. Sullivan, both of Birmingham, County of Warwick—all in England.
199,432. Apparatus for making cord-tire casings. J. M. Gilbert, New York City, N. Y., assignee of F. B. Carlisle, Andover, Mass. —both in the U. S. A.
199,463. Marking device for pneumatic tires. G. J. Anderson and W. R. Smith, co-inventors—both of Cleveland, O., U. S. A.

THE UNITED KINGDOM.

138,623. Mold for vulcanizing boots, etc., having adjustable heel and toe pieces and a base mold capable of being put under pressure. D. F. Wilhelmi, Huis ter Aa Doorwerth, Holland. (Not yet accepted.)
139,013. Device for heating hollow rollers used in rubber-working machines. O. Shaw, Kenley, Heaton Moor, Stockport.
139,411. Apparatus for retreading tires. S. H. Goldberg, Chicago, Ill., U. S. A.

THE FRENCH REPUBLIC.

500,417. Improvements in mounting pneumatic tires. A. E. Jennings.
500,878. Improvements in transferring system used especially in manufacturing tires. The Dunlop Rubber Co., Limited.
501,732. Machine to make pneumatic tire casings. J. L. G. Dykes.
501,749. Machine to expand the bands out of which pneumatic tires are made. J. L. G. Dykes.
501,785. Machine for expanding and vulcanizing casings for rubber tires. J. L. G. Dykes.
502,045. Apparatus and method for making tires. E. Hopkinson.

PROCESS PATENTS.

THE UNITED STATES.

NO. 1,336,911. Retreading tires in manner to prevent overvulcanization of any part. F. Maier, Los Angeles, Calif., assignor to Western Vulcanizer Manufacturing Co., Chicago, Ill., a copartnership.
1,337,802. Producing artificial leather by treating rubber layers. A. A. Somerville, Flushing, assignor to New York Belting & Packing Co., New York City—both in New York.

THE DOMINION OF CANADA.

199,442. Retreading tires. S. H. Goldberg, Chicago, Ill., U. S. A.
199,443. Retreading tires. S. H. Goldberg, Chicago, Ill., U. S. A.

THE UNITED KINGDOM.

138,535. Retreading tires. S. H. Goldberg, Chicago, Ill., U. S. A.

THE FRENCH REPUBLIC.

500,421. Improvements in the manufacture of solid rubber tires. The Dunlop Rubber Co., Limited.
500,522. Improvements in the manufacture of solid rubber tires. The Dunlop Rubber Co., Limited.
500,698. Improvements in the manufacture of solid rubber tires. The Dunlop Rubber Co., Limited.
501,035. Improvements in manufacture of tires. The Dunlop Rubber Co., Limited.
501,065. Improvements in manufacture of tires. The Dunlop Rubber Co., Limited.
501,099. Improvements in construction of pneumatic tires. W. P. Gordon and T. B. Jacock.
501,201. Improvements in retreading tires. S. H. Goldberg.
501,699. Manufacture of pneumatic tire casings. J. L. G. Dykes.

NEW TRADE PUBLICATIONS.

IN THE NUMBER FOR APRIL-MAY OF "THE PORTAGER," THE HANDsome little monthly magazine issued by the Portage Rubber Co., Akron, Ohio, John W. Maguire, vice-president and general manager, pays a graceful tribute to the branch managers and explains their importance to the business. The number contains portraits of all the branches and office managers of the company from Boston to the Pacific coast, with many other illustrations.

ZWEBELL BROTHERS CO., MILWAUKEE, WISCONSIN, HAS PUBlished a profusely illustrated descriptive catalog of 72 pages, devoted to its complete line of tire repair equipment, repair materials and accessories. It covers everything required for the up-to-date repair shop, including sectional cavity vulcanizers and high pressure retreaders of the individual steam-generating type with aluminum bead molds and reducing shells for all tire sizes up to and including 8-inch. The obvious economy and efficiency of these individual steam generators appeal to every repair man.

THE EAGLE RUBBER CO., ASHLAND, OHIO, PUBLISHES A MOST attractive catalog, illustrated in colors, of the many rubber toys it makes. The cover shows a baby girl with her puppy borne aloft by a bunch of little balloons of many hues. Balloons of many shapes are seen, some with noise-making attachments. The prize novelty, however, is the "Eagle Brand" bag-pipe, with a plaid bag, that should satiate youth's craving for noise.

TO SPREAD INFORMATION ABOUT THEIR MOTOR WHEELS AND THE many uses to which they may be put, the Briggs & Stratton Co., Milwaukee, Wisconsin, are issuing a handsome illustrated monthly magazine, called "The Motor Wheel Age."

A VALUABLE HELP FOR ENGINEERING AND KINDRED TRADES IS THE "Industrial Arts Index" published by The H. W. Wilson Co., New York City. In alphabetical arrangement, but with many convenient sub-heads, it supplies a subject catalog to the periodicals dealing with engineering and various trades and technical industries. Volume VIII, No. 3, for March, 1920, covers the first three months of the year.

"HOLLAND'S EAST INDIA," WHICH UNDER THE MANAGEMENT OF A. A. van der Kolk, has separated from the Buitenzorg, Java, "Dutch East Indian Archipelago," publishes an edition in French, "Les Indes Hollandaises," as well as an English edition.

"TRANSATLANTIC TRADE," JANUARY, 1920.—THIS IS A MONTHLY magazine published in the English language by the American Association of Commerce and Trade in Berlin, members of which seem to have penetrated into Germany as soon as hostilities ceased. Instructions are given to Americans as to how they may enter Germany equipped for business, and how they may secure protection if they need it. Lists of firms that are permitted to deal with America are printed, and also of the goods that are most needed.

THE FIRST NUMBER FOR 1920 OF THE *"Bulletin des Caoutchoucs"* of the *Marseille Institut Colonial* contains the report and recommendations of Dr. G. van Pelt, the director, on the rubber conditions in the French colonies, where he spent several months last year. He describes French Guinea and the Ivory Coast, tells how cultivation and the processes of preparing and packing the rubber should be changed in accordance with his ideas, and how the African natives may be induced to better their ways. France clearly intends to make a fight for her share in rubber, and Dr. van Pelt's investigation is one of the first steps taken.

JOSEPHINE A. CUSHMAN, ASSOCIATE LIBRARIAN, IN THE FIRST number of "Faculty Studies," issued by the Municipal University of Akron, explains what "a special library for the rubber industry" should contain, and in the footnotes gives excellent and helpful abridged bibliographies of many branches of the subject. The appendices give the most essential scientific journals and government publications with which a rubber library should start.

THE EDITOR'S BOOK TABLE.

"REPORT OF THE CEYLON CHAMBER OF COMMERCE (INCORPOrated) for the year ended 31st December, 1919." (Paper covers, 346 + 18 pages, charts, tables.)

THE "Report of the Ceylon Chamber of Commerce (Incorporated) for the year ended 31st December, 1919," contains the usual important tables and statistical information regarding crude rubber exports and imports from and into the island, with charts, including one in colors, giving rubber prices at local auctions. The larger portion of the volume is taken up with official correspondence and documents, and with the minutes of the meetings of the Chamber.

"AIRCRAFT YEAR BOOK, 1920." MANUFACTURERS' AIRCRAFT Association, Inc. Doubleday, Page & Co., New York. (Cloth, octavo, 9¼ by 6 inches, 334 pages.)

The second yearly issue of the "Aircraft Year Book," besides interesting articles on the development of aircraft in commerce and in war, and reports on the activities of the Manufacturers' Aircraft Association, contains a compact and instructive summary of the technical development of balloons and airships in the years since the beginning of the war. In this, some account is given of the important construction work done in this line during the war by The Goodyear Tire & Rubber and The B. F. Goodrich companies. There are many fine illustrations and useful lists and tables.

REPORT TO THE BOARD OF TRADE OF THE EMPIRE COTTON Growing Committee, 1920. London, His Majesty's Stationery Office. (Paper, 67 pages, 7 maps.)

The report submitted to the British Parliament last October by a committee appointed in the summer of 1917, at the instigation of the British cotton interests, to survey the possibilities for raising cotton within the empire, has been mentioned in the press for some time, but now appears officially.

It is of particular interest because of the desire, openly expressed in many English newspapers, to free the British cotton industry from dependence on the United States. The survey includes Africa, with the possessions recently acquired from Germany, as well as India, the West Indies, and other portions of the empire, where cotton is raised, and is illustrated by the maps. The example of the supremacy that rubber production acquired in a dozen years by the British in Malaya, Ceylon and Southern India, inspired the committee, and should give food for reflection to the American cotton planters.

"DYKE'S AUTOMOBILE AND GASOLINE ENGINE ENCYCLOPEdia." By A. L. Dyke, E. E. Twelfth edition, A. L. Dyke, St. Louis, Missouri. (Cloth, large octavo, 10 by 7 inches, 940 + 22 pages, profusely illustrated.)

This compendious repertory of automobile information is now in its tenth year, the editions following on one another faster than once a year. The elaborate indexes are a necessary guide through the maze of instructions about the construction, mechanism, handling, adjusting and repairing of automobiles, their engines, the ignition, lubricating, electric systems, tires and their troubles and the myriad matters on which immediate practical information may be needed; everything illustrated fully with pictures and diagrams. Special supplements are added to this edition on airplanes, Liberty engines, the Ford and Packard cars and the K. W. Magneto, together with inserts supplying additions of very recent information to many articles.

BY ARTICLE 307, SECTION 2, OF THE TREATY OF VERSAILLES, CARried into effect by the Reichs Law of August 31, 1919, all patents and trade marks which were declared void on account of nonpayment of dues during the period between August 1, 1914, and January 10, 1920, are declared valid as from the last-named date.

New Goods and Specialties.

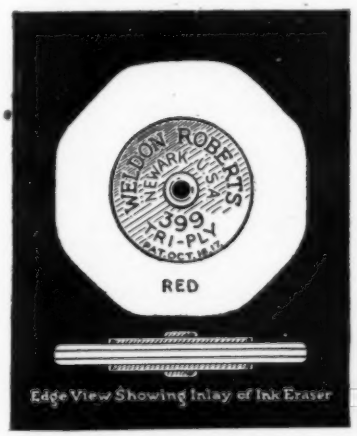
A SAFETY AXE FOR THE SUMMER CAMPER.

Now is the time when plans are going forward for summer camping trips, and no outfit is complete without a reliable axe or strong hatchet with which to blaze trails, cut trees, boughs, and firewood, and do the numberless odd jobs that fall to the lot of the camper. That dealer who can supply his customers with an axe provided with a guard so that it can with safety be put into the coat pocket or packed with other articles without danger of injuring them, should benefit by increased sales. The safety pocket axe shown here has a nickel-plated spring hinged guard lined with lead, that folds into the handle. The blade is made of carefully tempered tool steel, while the metal handles are drop forged, with side-plates of rubber. The length is 11 inches and the weight 20 ounces. (Marble Arms and Manufacturing Company, Gladstone, Michigan.)

SAFETY POCKET AXE.

COMBINATION INK AND PENCIL ERASER.

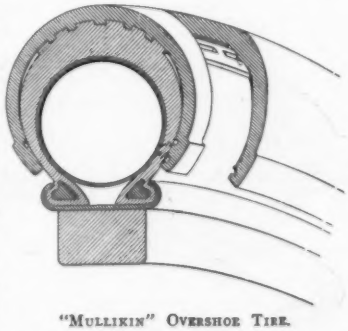
Designed for the use of the typist who requires a soft eraser to remove pencil marks and carbon impressions as well as inked or typed copy, the "399 Tri-Ply" eraser has found a welcome in the business world. The two outer layers of rubber are soft and velvety, while the center layer is of harder stock. When the center edge is brought to bear upon manuscript written with pen or typewriter, erasing becomes easy. The side edges are used for removing pencil marks. (Weldon Roberts Rubber Co., Newark, N. J.)



"399 TRI-PLY" RED ERASER.

A NEW OVERSHOE TIRE.

The tire illustrated claims a new patented feature in a tread which is removable and interchangeable and can be used on all makes of tires as well as on this specially constructed one. The overshoe is made in a separate piece and its inner face opposite the casing is provided with longitudinal and transverse projections and recesses so correspond to those in the tire. This feature insures against creeping, either longitudinally or transversely. There are also a number of suction cups in the inner face of the overshoe, in the thickened side portions, which hold the sides firmly in position on the casing. The tread portion is made of durable rubber and the overshoe is not vulcanized to the casing. The casing, protected by the overshoe, does not come in contact with the ground and is not exposed, therefore wearing indefinitely long. (Brooks J. Mullikin, Box 23, Station N, New York City.)


"MULLIKIN" OVERSHOE TIRE.

A NEW ARTIFICIAL BAIT.

The angler who enjoys game fishing will welcome this new "Crawdad Natural Crab" bait, with its body so true to life in color and shape, its beady black eyes, and its moving rubber legs. The hooks are bronze. (The Creek Chub Bait Co., Garrett, Indiana.)

"THE CRAWDAD NATURAL CRAB."

THREE NEW WESTERN TIRES.

Three good-looking tires will be produced by a new Western rubber company, as well as an inner tube. The center one of the three tires below is the invention of Grant Lambright, the company's general superintendent. It is intended chiefly for light trucking and has been successfully tried out and tested. It combines the advantages of a pneumatic with those of a solid tire. The non-skid tread is designed to distribute road friction evenly, while the ribbed tire has extra thick side walls. (The Latex Tire & Rubber Co., Fond du Lac, Wisconsin.)

LATEX NON-SKID. LAMBRIGHT CUSHION. RIBBED TREAD.

AN IMPROVED STEP-MAT.

The particular feature of the step-mat pictured here is a flap which turns up from the running-board and prevents the scratching of the car by overstepping. The pattern is of the self-draining type, so that any water collected is thrown away by the forward motion of the car. The rubber used is of good quality and serviceable. A running-board mat of this kind is an admirable preventive of slipping when entering a car. (Essex Rubber Company, Trenton, New Jersey.)

"ESSEX IMPROVED" STEP-MAT.

THREE BATHING CAPS FOR SUMMER DAYS.

The "Tiger Lily" bathing cap pictured here has a red, blue, green, or yellow body with a large black-striped flower. The

"TIGER LILY." "COLLEGE CAP." "DAISY."

"College" cap is patterned after the familiar "mortar board," with long streamers, and wooden buttons suspended from the corners. The "Daisy" comes in the same colors as the "Tiger Lily" and has each petal apparently fastened down with a rubber button, while a black celluloid buckle forms the center. (The Miller Rubber Company, Akron, Ohio.)

HAIR BRUSH WITH RUBBER CUSHION.

The dainty woman likes a hair brush that can be thoroughly cleaned from time to time, and the one illustrated here accomplishes this by means of a removable rubber cushion to which the high-grade, stiff black bristles are vulcanized. The cushion is removed by means of a button which pulls out as shown in the picture. (O. Dennin's Sons, Inc., Troy, New York.)

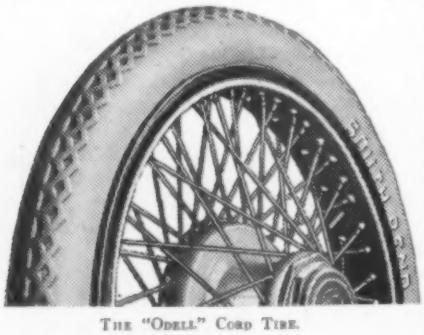
"BEAUTIFIER" SANITARY HAIR-BRUSH.

"ADHESO" MILLINERY GLUE.

A strong millinery glue or rubber cement which is waterproof, colorless, durable, and will not burn or explode, is called "Adheso." It has been tested by the National Board of Fire Underwriters and favorably reported on. This glue is used in various ways in applying trimming to hats, as well as for the insertion of hat linings without sewing. (James B. Day & Co., 214 West Ohio street, Chicago, Illinois.)

STANDARD AND OVERSIZE CORD TIRE.

A cord tire which is made in both standard and oversize sizes enables the car owner to procure either or both for the asking. The conformity of this tire to the original fabric size standards and the standard oversizes make for easier riding and more mileage, without wrenching and straining of the differential and the chassis. The "Odell" cord, it is claimed, insures perfect balance and distribution of the weight of the car. This is a quality tire, hand manufactured. (International India Rubber Corporation, South Bend, Indiana.)



THE "ODELL" CORD TIRE.

A NEW FABRIC-RUBBER SOLE.

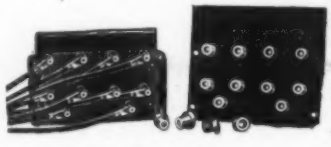
A new fabric-rubber sole is called the "Gro-Cord." In principle its construction follows that of the wood paving block which presents its cross-grain side to traffic. This sole is composed of rows of cord fabric set on end in sequence and vulcanized into the pliable rubber body so that the ends of the cords present themselves on the walking surface. It is claimed that the "Gro-Cord" sole will not cause the sensation of burning sometimes experienced when rubber soles are worn, and that it is water-proof, noiseless, flexible, and non-slipping. The base of this sole is thin, strong fabric, vulcanized to the sole proper. This prevents bulging or stretching. The sole is left the full thickness at the shank and has two plys of strong fabric on the bottom running forward under the tread to strengthen the shank and keep the sole from breaking. Because of its construction, the "Gro-Cord" sole may be attached to shoes by stitching.

THE "GRO-CORD" FABRIC SOLE.

This sole was formerly made by the Firestone Tire & Rubber Co., Akron, Ohio, under agreement with the inventor, J. E. Grosjean, and was known as the Firestone fabric-sole. When the Firestone company decided to discontinue the retail end of its boot and shoe business, the inventor purchased the equipment for the manufacture of this sole and formed the present company to produce it. (The Lima Cord Sole and Heel Company, Lima, Ohio.)

RUBBER-INSULATED COIL-BOX PROTECTOR.

A coil-box protector which keeps out rain and snow and makes short circuits impossible, it is claimed, is shown here. Rubber bushings are inserted in the holes in the plate which forms the protector, and through these bushings pass the electrical connections. (Charles F. Lyngaas, 135 Wooster street, New York City.)



"CASCO" COIL-BOX PROTECTOR.

THE "CELOGLAS" SAFETY GOGGLE.

Among the numerous safety goggles now to be had, the one illustrated here claims a peculiar lens construction consisting of a thin sheet of celluloid cemented between two sheets of glass so as to prevent the glass from flying or falling out of the frame when cracked or broken. These goggles are equipped with side shields of perforated nickeled metal and are held in place by

"STOCO 'CELOGLAS'" GOGGLES.

elastic webbing which buckles around the head of the wearer. (Standard Optical Company, Geneva, New York.)

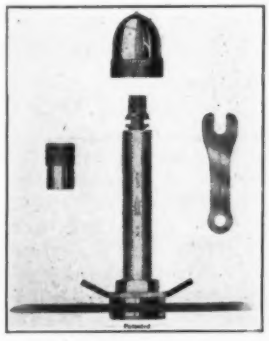
THE "WILLSON" SAFETY GOGGLE.

A safety goggle with novel provision for the renewal of the rubber tubing which binds the edges coming in contact with the face of the wearer has aluminum cups with serrated edges. Over the serrations the rubber tubing is fitted by means of short slits. A short piece of rubber tubing is slipped over the leather strap which connects the goggles over the nose. The lenses of these goggles are set in a frame so designed, it is claimed, that if the glass is broken it must fall out instead of in. Besides, the lenses in their frames may be removed by sliding forward the clamp to which the elastic head-bands are attached. (Willson Goggles Inc., formerly T. A. Willson & Co., Inc., Reading, Pa.)

THE "WILLSON" SAFETY GOGGLE.

A VALVE THAT LOCKS THE AIR IN THE TIRE.

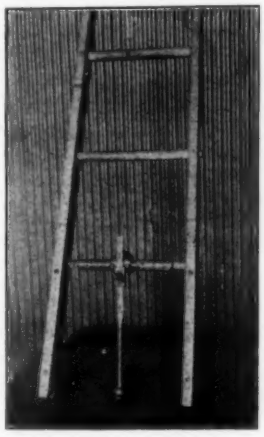
The "Air Lock" tire valve is so constructed that it locks the air in the inner tube for an indefinite length of time, until the tire suffers a blowout or puncture. This valve may be used with any cap, nut, or cleat. The use of a new inner tube is recommended, but an old one which is known not to leak may be used. It is claimed that a permanent degree of pressure may be maintained within the tire by means of this valve, which tends to increase tire life and mileage. The centers of these valves are interchangeable. Five standard sizes are available, for wire, disk, and artillery wheels—2, 2½, 3, 3½ and 4-inch. (The Griffin Manufacturing Co., Inc., 113 State street, Boston, Massachusetts.)



"AIR-LOCK" VALVE.

VACUUM CUP LADDER STAY.

The vacuum cup principle has been employed in working out this safety device for holding ladders in position. A clamp of malleable iron, which is adjustable, fits around the lower rung of any ladder. Through this clamp is inserted a rod, also of malleable iron, whose lower end is cut on a bevel of eight degrees, so that no matter at what angle the ladder is placed, the safety stay exerts a direct downward pressure. The bottom of the rod is adapted for holding a rubber suction cup or a steel point, depending on the nature of the surface on which it is to be used. When the device is not in use, it may be moved over to one side of the ladder and folded up out of the way, if it is not convenient or desirable to remove it entirely. (Maxwell Safety-Ladder-Stay, 101 West 43d street, New York City.)



MAXWELL LADDER STAY.

"DURATOP" RUBBER-COATED FABRIC FOR AUTO TOPS.

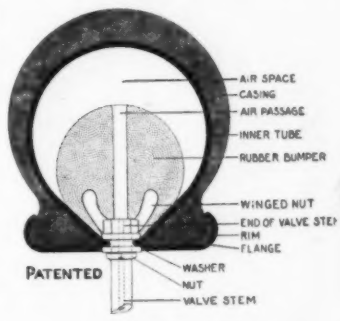
A new material for automobile and carriage tops, curtains, etc., is "Duratop," which has a heavy woven cotton backing coated with rubber. The weight of the material varies according to the purpose for which it is intended to be used. The trade mark has just been registered in the United States. (The Duratex Company, Newark, New Jersey.)

RUBBER MATS BEHIND THE SODA FOUNTAIN.

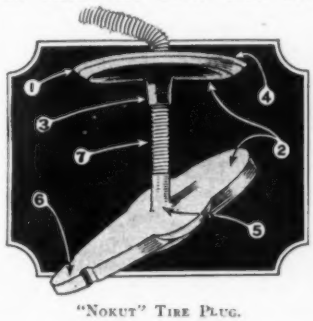
A new mat, made in one size, color and thickness only, has been designed for use behind soda fountains. It is made with stout rubber disks on the bottom, which hold it one-quarter of an inch off the floor, permitting free drainage beneath. The top layer is of fine, flexible mat stock, corrugated to give a firm footing. Perforations in the mat permit the drainage of any liquid spilled upon it. The mat is 18 by 24 inches. (United States Rubber Company, New York City.)

IT WARNS WHEN TIRE IS FLAT.

A unique device for warning the automobile driver when his tires are becoming flattened is shown in cross-section in the diagram at the right. A winged nut which forms the end of the valve stem is embedded in a ball of rubber. Whenever the air inside the inner tube becomes reduced as much as fifty per cent, this ball causes a slight bump as the tire revolves. (Columbus Rubber Mills, successors to Tomah Rubber Corporation, Milwaukee, Wisconsin.)



FLAT TIRE ALARM.



"NOKUT" TIRE PLUG.

THE "NOKUT" TIRE PLUG.

A new plug for tires that have become punctured emphasizes the following features indicated in the illustration: (1) beveled edge preventing cutting of tire; (2) rubber anchored and chemically welded to metal cores; (3) rubber packing unites cap with base, preventing metal from touching tire; (4) arched cap to conform to tire surface; (5) no open slot to leak; (6) inserting point, with rubber cement, is easily forced into puncture; (7) threaded stem of strong steel so that "Nokut" rubber can be clamped solidly without stripping stem. (Stevens & Company, 375 Broadway, New York City.)

A REINFORCED HEEL AND NEW HALF SOLE.

A new non-skid, reinforced rubber heel and sole are illustrated herewith. The heels are made right and left and the outside corner is reinforced with a heel-plate designed to give additional rubber where most people find the greatest amount of wear. The "Paris" heel is made in two sizes only, A and B, and has a concave under surface and a flat upper surface. It is designed to fit only French heel shapes.

The "Portland" non-skid half-sole is made with both plain and corrugated ball surface and includes the original feature of the shank edge reinforced with plies of canvas to hold the heads of the nails. Patents are pending. (Portland Rubber Mills, Portland, Oregon.)

"PARIS" HEEL.

The Obituary Record.

PROMINENT IN THE LEAD INDUSTRY.

OLIVER SHEPPARD PICHER, president of The Eagle-Picher Lead Co., died after a short illness of pneumonia, at his home in Winnetka, Illinois, April 26, 1920.

OLIVER S. PICHER.

Mr. Picher was born at Springfield, Missouri, but spent his boyhood and youth in California. He was a graduate of Leland Stanford Junior University and Columbia Law School. After three years in the office of Elihu Root, of New York, he went to Joplin, Missouri, where his father, Judge O. H. Picher, was president of The Picher Lead Co., with the intention of practicing law there, but soon became interested in manufacturing and abandoned the law for business. In 1906 he became secretary of The Picher Lead Co., a position which he held for three years, until he was elected president to succeed his father, who had retired and gone to live in California.

In 1916 The Eagle White Lead Co. and The Picher Lead Co. were merged into The Eagle-Picher Lead Co., and Mr. Picher became president of the consolidated companies, a position which he filled with success until his death.

He was director and chairman of the finance committee of the American Zinc Institute; a member of the Society of Colonial Wars, Sons of the Revolution, and Columbia Chapter of Alpha Delta Phi. His clubs were the University, Mid-Day, Union League, Evanston Golf, Indian Hill Golf; and the Midwick Country Club, Los Angeles.

In 1904 Mr. Picher married Emily Stanton, a daughter of William Stanton and a niece of Edwin M. Stanton, President Lincoln's famous Secretary of War, and had four children, two sons and two daughters, Oliver, Charlotte, Stanton and Muriel, all living.

Mr. Picher was a man of unusual vigor, and exceptionally winning personality, so that every man in the company feels his death a personal loss, as do his many friends in the rubber and paint trades. His knowledge, judgment and ability found expression in the business which stands a monument to his talent. Although primarily a business man, he became chief expert in every technical activity of his company. He was an accountant, metallurgist, a mining engineer, a chemist, a manufacturer, a financier, and withal gifted with such rare charm of personality as brought to him literally thousands of friends in the business and technical world.

LEADING CHEMICAL MANUFACTURER.

I. Frank Stone, for many years at the head of the National Aniline & Chemical Co., died in New York on May 10, 1920, in his fifty-fourth year. He was born in Chicago in 1867 and went into the drug business, organizing the firm of Stone & Ware when he was 22. In 1897 he moved to New York, merging with the Schoelkopf, Hartford & Hanna Co. three years later. He became president of the National Aniline company in 1906, retaining the office till last year, when he retired. Mr. Stone was vice-president of the Drug and Chemical Club, president of the Chemists' Club, a director of the Schoelkopf Aniline and Chemical Works, Inc., of the Contact Process Co. and Rollin Chemical Co., and belongs to many clubs. He leaves his widow and one daughter.

CHICAGO MANAGER OF TWITCHELL GAUGE CO.

Max D. Bendel, manager of the Twitchell Gauge Co., Chicago, Illinois, died suddenly from heart failure at Chicago on May 7, 1920.

Mr. Bendel succeeded to the management of the Twitchell Gauge Co. in 1912 shortly after the company was acquired by A. Schrader's Son, Inc., of Brooklyn, New York. In addition to his duties as sales executive of the Twitchell company, he also conducted the Chicago branch of the Schrader company. He was highly successful as a salesman and the rapid expansion of the Twitchell business was in a great measure due to his aggressive personality and enthusiasm.

FOUNDER OF THE KAUFMAN RUBBER CO.

Jacob Kaufman, founder of the Kaufman Rubber Co., Limited, the well-known Canadian rubber footwear manufacturer, who died on April 20, was markedly a self-made man. He was born on a farm in New Hamburg, Ontario, in July, 1847; went to the village school and learned the carpenter's trade. At thirty he married one of his employer's daughters, moved to Berlin, and started a sash and door factory, which prospered.

JACOB KAUFMAN.

Until 1900 his interests were entirely in lumber, in saw mills, in charcoal and wood alcohol factories. Then he became interested in rubber and the Berlin Rubber Footwear Co. Three years later he started the Merchants Rubber Co., which he sold in 1906 to the Canadian Consolidated Rubber Co., Limited. The following year he started the Kaufman Rubber Co., Limited, at Berlin, which in the late war was rechristened Kitchener, building and repeatedly enlarging the plant, that is now one of the most modern rubber footwear factories in Canada.

Mr. Kaufman took part in the public and religious life of the town he had built up. He leaves his widow, two daughters and two sons, three brothers and four sisters.

OVER THIRTY YEARS WITH TYER RUBBER CO.

Frank Tyler Carlton, purchasing agent of the Tyer Rubber Co., Andover, Massachusetts, died recently at his home in Andover after a brief illness. He was a native of Andover and was always active in the affairs of the community, especially in connection with the church life of the village.

Mr. Carlton began his business career with the Tyer Rubber

Co. in June, 1886, coming to the company immediately after his graduation from high school, and continuing there until several weeks before his death.

EDITOR OF "WILEMAN'S REVIEW."

Joseph Philip Wileman, editor of "Wileman's Brazilian Review," died at São Paulo, Brazil, on April 18, 1920, at the age of 67 years. He was born at Uttoxeter, England, in 1853, and went to Brazil in 1898. He established himself at Rio de Janeiro, where he started his journal and also the printing establishment which he owned, the *"Imprensa Ingleza."* He took a deep interest in Brazilian finance and economics and was chosen to organize the official statistical bureau, of which he was the head until a few years ago. While in charge he compiled and published the admirable "Brazilian Year Book." Mr. Wileman had long suffered from a lingering disease. He leaves a son and three daughters; the son, H. F. Wileman, will edit and manage the "Review," which will continue.

RUBBER TRADE INQUIRIES.

THE inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

(806.) A request has been received for the addresses of manufacturers of machinery for making friction fabrics, including friction tape.

(807.) A correspondent desires to buy rubber plates for dress shields, in quantity.

(808.) The names of makers of dipped goods machinery are requested.

(809.) A repairman desires to know how to separate rubber from fabric to make rubber gum and tire cement.

(810.) A rubber waterproofing for canvas covering is required by a manufacturer of surf coasters.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS.

Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or from the following district or cooperative offices. Requests for each address should be on a separate sheet, and state number.

DISTRICT OFFICES.	COOPERATIVE OFFICES.
New York: 734 Customhouse.	Cleveland: Chamber of Commerce.
Boston: 1801 Customhouse.	Cincinnati: Chamber of Commerce; General Freight Agent, Southern Railway, 96 Ingalls Building.
Chicago: 504 Federal Building.	Los Angeles: Chamber of Commerce.
St. Louis: 402 Third National Bank Building.	Philadelphia: Chamber of Commerce.
New Orleans: 1020 Hibernia Bank Building.	Portland, Oregon: Chamber of Commerce.
San Francisco: 307 Customhouse.	Dayton, Ohio: Dayton Chamber of Commerce.
Seattle: 848 Henry Building.	

(32,571.) A merchant in Chile wishes to communicate with makers of machinery for the manufacture of rubber goods, such as rubber overshoes, raincoats, and hot-water bottles. Catalogs requested.

(32,575.) An engineer in Belgium desires an agency for the sale on commission of rubber articles. Correspondence and catalogs in French.

(32,671.) An importer in Turkey wishes to be put in communication with manufacturers and exporters of rubber goods and rubber shoes.

(32,684.) A merchant in Algeria desires an agency for the sale of manufactured rubber articles of all kinds, automobile and truck tires, inner tubes, bicycle and motorcycle accessories, raincoats, pharmaceutical supplies and so forth. Quotations c. i. f. Algeria. Correspondence in French.

(32,694.) A firm in Mexico wishes agency for the sale of rubber belting. Quotations f. a. s. New York or San Francisco. Catalogs and samples requested.

(32,703.) A commercial agency in Mexico wants agency for sale of druggists' sundries, hot-water bags and bottles, etc. Quotations f. a. s. New York or San Francisco.

(32,721.) A merchant in Switzerland desires an agency for the sale of all kinds of rubber goods and novelties, druggists' and hospital supplies. Quotations c. i. f. Marseilles, France. Cash against documents. Correspondence may be in English.

(32,775.) A company in Danzig wants an exclusive agency for automobiles, accessories, and tires; also wishes to purchase goods on own account. Quotations c. i. f. Danzig. Cash against documents at Danzig. Correspondence in German.

(32,796.) An importer in India wants an agency for the sale of rubber goods of all qualities. Quotations c. i. f. Colombo, Cochin or Tuticorin. Payment by documentary credits at 90 days' sight.

SEVENTY CARLOADS OF ZINC OXIDE.

The illustration shows one of the two trainloads of zinc oxide sent from the New Jersey Zinc Company's works at Palmerton, Pennsylvania, to the tire factories at Akron, Ohio,

A SOLID TRAINLOAD OF ZINC OXIDE FOR AKRON RUBBER MILLS.

as "emergency specials," during the recent railroad strike. There were seventy carloads, weighing about 150 tons, all of the XX lead-free grade. The trains were run on a special schedule almost as fast as passenger trains and relieved the acute shortage of zinc oxide at the rubber plants.

The New Jersey Zinc Company's new plants now under construction will be completed probably in the early fall. The plant at Cañon City, Colorado, will furnish a grade of zinc oxide especially suitable for the requirements of the rubber industry.

SUMMER MEETING OF THE S. A. E.

The program is announced for the summer meeting of the Society of Automotive Engineers to be held at Ottawa Beach, Michigan, from June 21 to 25. On Monday, June 21, there will be sessions of the Standards Committee and in the evening, the semi-annual business meeting will be held. Sports have been arranged for every afternoon, and prizes will be given for each contest—base ball, tennis, golf, and some new games. Tuesday, June 22, the fuel session; Wednesday, June 23, transportation; Thursday, June 24, farm power, and Friday, June 25, the labor question and factory organization. There will be exhibits of automotive apparatus, like those of last year.

ORGANIC ACCELERATOR.

Triphenyl guanidine, a highly concentrated product from aniline oil and thiocarbanilid, is quite well known among the rubber laboratories as a vulcanization accelerator with recognized advantages. Among these are its efficiency as a catalyzer and its lesser cost as compared with other catalyzers of similar strength.

Activities of The Rubber Association of America.

RATES TO PACIFIC COAST PORTS AND TRANSCONTINENTAL INTERMOUNTAIN TERRITORY.

AT THE MARCH MEETING of the Traffic Committee, consideration was given to a complaint now before the Interstate Commerce Commission, with respect to a proposal of the carriers to revise rates from all territory east of the Missouri River to San Francisco, Seattle, Spokane, Nevada and Arizona points, etc., which if accomplished would result in substantial increases in rates on articles of rubber manufacture from shipping points east of Chicago, Illinois, and St. Louis, Missouri. It is felt by the Traffic Committee that this proposed revision of rates would result in disadvantages to the members of the Association who market their product at far Western points, and for this reason the Committee has presented objections to this proposed action of the carriers. The Traffic Department and the Committee's commerce attorney appeared in this case for the Association at the hearings held before the Interstate Commerce Commission in New York on May 7 and Chicago on May 10.

CASH PAYMENT OF FREIGHT CHARGES.

The Interstate Commerce Commission held a hearing in Washington in order to obtain the views of the shippers and the railroads with respect to the cash payment of freight charges, with the idea of formulating rules for the guidance of the railroads based on the revisions of the new Transportation Act, providing that the carriers shall be responsible for the collection of correct freight charges on and after July 1, 1920, with such exceptions thereto as may be permitted by the Interstate Commerce Commission.

During the period of Federal Control, the United States Railroad Administration discontinued granting limited credit that had been accorded shippers under certain conditions by the individual carriers, and required the payment of freight charges by those formerly receiving credit, within forty-eight hours after the presentation of freight bills.

The Traffic Department was represented at this hearing in Washington and presented a proposal on behalf of the rubber industry, asking that the Commission prescribe rules permitting an extension of the credit time to seven days from date of presentation of freight bills; each month to be divided into four payment periods. It is understood that this request is predicated upon the Commission requiring satisfactory guarantee being furnished the carriers by the shippers.

RUBBER ASSOCIATION BULLETIN SERVICE.

The Rubber Association of America maintains an information service through "Bulletins" for its members by which it calls their attention to matters that may concern them. During the past month bulletins have been sent out covering the following subjects that are important to the question of industrial relations: "Saving Banks Deposits in the United States"; "Expenditures of Trade Unions in the United States"; "Sharing Savings in Production with Labor"; "Report of Second Industrial Conference"; and the following report on physical examination.

THE PHYSICAL EXAMINATION IN INDUSTRY.

The Conference Board of Physicians in Industry has just completed a study of physical examinations in twenty-eight corporations who together employ over 350,000 men and women. The returns indicate quite clearly that while the physical examination in industry is comparatively new, employers and employes have recognized its value. Of the twenty-eight plants studied, physical examinations were introduced in one as early as 1900; in two others between 1900 and 1910; in six others between 1910 and 1914, and in the remaining nineteen, during or since 1914. In only one instance, that of a textile mill employing 2,700 persons, was the physical examination discontinued. The reason given in this case was "labor conditions."

In general, employes welcome the examination. The number of those objecting was found to constitute a fraction of 1 per cent and was regarded as too small to tabulate. The reason given by employes who objected to examination invariably took one or both of two forms: "red tape" and "opposition to exposure." Employes who object to examination are frequently those who fear that such an examination will disclose some defect or a diseased condition.

In the plants studied, it was found that of all employes examined, the average number of those rejected was four in every hundred. In six plants employing women, the physical examination was made by a woman physician. In another plant, women workers could upon application have a woman physician examine them. In the other plants, women were examined by male doctors. With but five exceptions, the results of the physical examination are used as a guide in placing employes within the factory. In these five cases the examinations are made for special reasons only and are not required of all applicants. The time required by the physicians to make the examination was found to vary from three to forty minutes, the average ranging between six and ten minutes.

The benefits claimed for the physical examination in the replies received, are that they protect the employe, his fellow worker, and also the employer. Employes are not permitted to engage in an occupation in which they would be a menace to themselves, to others, or to property. Accident hazards are thereby reduced, labor turnover is reported as being lessened, and employes, on the whole, as being more satisfied.

Through the general bulletin service, rubber manufacturers were informed that Trade Commissioner Sanger has completed his report on advertising methods in Argentina, Uruguay, and Brazil, and it is now ready for distribution. Copies can be obtained for thirty cents currency by applying in person to any of the district or cooperative offices of the Bureau of Foreign and Domestic Commerce, or by addressing the Superintendent of Documents, Washington, D. C.

Copies of the "Memorandum on the Rubber Industry Prepared by the War Service Committee of the Rubber Industry of the U. S. A." and the addendum of authorities for the statements made in that memorandum were sent to all firm members of the association.

A list of export business opportunities was sent to firm and affiliated members.

EXCELSIOR RUBBER PASTE.

A new softening ingredient to assist the incorporation of ground rubber waste in rubber mixings has recently been introduced to the American rubber trade by its English manufacturers. It may be employed to the extent of ten per cent of the batch and is said not only to facilitate the mixing operation but to improve the finished material.

PROOFING FORMULA.

The following formula for a proofing mixture is proposed by Perkin and Mandleberg: cauotchouc 25 parts, dry alumina 60, asbestos powder 7, litharge 6, and sulphur 1 part.

This mixing is dissolved in naphtha and applied by a spreader. Vulcanization is effected by steam heat. (*"Le Caoutchouc et la Gutta Percha."*)

News of the American Rubber Industry.

DIVIDENDS.

THE Ajax Rubber Co., Inc., New York City, has declared its regular quarterly dividend of $1.50 a share, payable June 15 on stock of record June 1, 1920.

The Bergougnan Rubber Corporation, Trenton, New Jersey, declared a quarterly dividend of one and three-quarters per cent, payable May 15 on preferred stock of record April 10, 1920.

The Boston Woven Hose & Rubber Co., Cambridge, Massachusetts, has declared its regular quarterly dividend of $3 on common stock and its semi-annual dividend of $3 on preferred stock, both payable June 15 on stock of record June 1, 1920.

The Brunswick-Balke-Collender Co., Chicago, Illinois, declared the following dividends: stock, 200 per cent, payable May 15; quarterly, one and three-quarters per cent, payable May 15 on stock of record May 4, 1920.

The Fisk Rubber Co., Chicopee Falls, Massachusetts, has declared its quarterly dividend of one and three-quarters per cent, payable June 15 on preferred stock of record May 31, 1920.

The General Electric Co., Schenectady, New York, has declared quarterly dividends as follows: cash, two per cent, and stock, two per cent, both payable July 15 on stock of record June 10, 1920.

The Globe Rubber Tire Manufacturing Co., Trenton, New Jersey, has declared a quarterly dividend of one and one-half per cent, payable June 15 on common stock of record May 31, 1920.

The Lee Rubber & Tire Corporation, Conshohocken, Pennsylvania, has declared a quarterly dividend of fifty cents a share, payable June 1 on stock of record May 15, 1920.

The National Aniline & Chemical Co., New York City, has declared a quarterly dividend of one and three-quarters per cent, payable July 1 on preferred stock of record June 14, 1920.

The New Jersey Zinc Co., Inc., New York City, has declared a quarterly dividend of four per cent, payable May 10 on stock of record April 30; and a stock dividend of 20 per cent on its $35,000,000 of stock outstanding, payable June 10 on stock of record May 12. Stockholders may subscribe before November 15, 1920, to $7,000,000 of new stock at par, $100, on the basis of one share for every five already held.

The Star Rubber Co., Akron, Ohio, declared a 100 per cent stock dividend, payable April 1, and gave to stockholders of record April 20 the right to subscribe to common stock at par up to 20 per cent of their holdings, the stock to be issued May 1.

The Victor Rubber Co., Springfield, Ohio, has declared a quarterly dividend, increased from seventy-five cents to one dollar a share, payable May 15 on common stock.

NEW INCORPORATIONS.

Astor Rubber Co., Inc., May 15, 1920 (New York), $250,000. S. M. Cohen, H. M. Cunningham, H. L. Klein—all of 2 Rector street, New York City. To manufacture rubber goods, coats, tires, etc.

Barr Rubber Products Co., The, April 1, 1920 (Ohio), $25,000. N. Barr, president and general manager; J. Dorn, vice-president; W. H. Adams, secretary and treasurer—all of Lorain, Ohio. Principal office, Lorain, Ohio. To manufacture toy balloons, bathing caps, etc.

Bartoo Tire & Rubber Co., Inc., May 12, 1920 (New York), $25,000. H. C. Bartoo, L. C. Olden, both of Eden; A. L. Endres, 94 Grant street, Buffalo—both in New York. Principal office, Buffalo, New York. To manufacture tires, etc.

Bes-Yet Tire Service Co., Inc., The, April 30, 1920 (New York), $10,000. R. Kull L.; N. Daymont, both of New York Mills; J. N. Daymont, Utica—both in New York. Principal office, Utica, New York. To repair tires.

Coast Tire & Rubber Co., August 29, 1919 (California), $50,000. H. Ives, president; J. I. Pankratz, vice-president; N. B. Campbell, treasurer; W. D. Forbes, secretary; E. Lawhorn, superintendent. Principal office, 408 Syndicate Building, Oakland, California. To manufacture tires and tubes.

Elasto Textile Co., March 30, 1920 (New York), $15,000. H. Stott, C. F. Jones, J. J. Healey—all of Cohoes, New York. Principal office, Cohoes, New York.

Enterprise Vulcanizing Co., April 15, 1920 (New York), $10,000. A. and M. Herman, C. H. Paulsen—all of 402 Dean street, Brooklyn, New York. Principal office, Brooklyn, New York.

Everwear Tire Co., April 23, 1920 (Delaware), $1,000,000. W. S. Gauntt, St. Louis; B. N. Morris, Kansas City—both in Missouri; W. O. Young, Wagstaff, Kansas. To manufacture and sell rubber tires and inner tubes, etc.

Fort Pitt Rubber Products Co., March 23, 1920 (Delaware), $1,000,000. L. A. Irwin, M. L. Rogers, W. G. Singer—all of Wilmington, Delaware. To manufacture and deal in rubber and its by products.

Gillette Tire & Rubber Co., March 30, 1920 (Delaware), $100,000. R. K. Thistle, A. R. Meyers, R. J. Gorman—all of New York. To manufacture tires.

Glendenning Asbestos & Rubber Corp., May 8, 1920 (New York), $110,000. W. J. Glendenning, 2003 Albemarle Road, Brooklyn; S. J. Lieneskind, Pelham; L. D. Kimbal, 243 West 21st street, New York City—All in New York. To manufacture rubber and asbestos products.

Hale & Co., R. H., March 3, 1920 (New York), $15,000. R. H. Hale, L. G. Hamersley. Principal office, 1947 Broadway, New York City. To deal in tires.

Hudson Tire & Rubber Co. of Pittsburgh, May 6, 1920 (Delaware), $1,000,000. B. H. Resnick, S. Golb, J. Gusky—all of Pittsburgh, Pennsylvania.

Ideal Tire & Supply Co., March 30, 1920 (New Jersey), $50,000. A. W. Combs, 470 Norwood street; T. F. McHugh, 465 Norwood street, both of East Orange; F. Stiers, 329 Essex avenue; P. D. Jones, 9 Lenark avenue, both of Newark—both in New Jersey. Principal office, 197 Market street, Newark, New Jersey. Agent in charge, F. Forlenza. To manufacture, buy, sell, and generally deal in tires, etc.

Indiana Rubber & Tire Co., Inc., May 4, 1920 (New York), $10,000. I. Eisner, 1800 Seventh avenue; J. Deitcher, 970 Eighth avenue, both of New York City; I. Weisman, 134 Alabama avenue, Brooklyn—both in New York. To manufacture tires.

Larson, Jr., Corp., L. P., April 9, 1920 (Delaware), $5,500,000. T. L. Croteau, M. A. Bruce, S. E. Dill—all of Wilmington, Delaware. To Manufacture paper, rubber, etc.

Lima Rubber Co., The, February 18, 1920 (Ohio), $200,000. (On April 28, 1920, the name of this concern was changed to The Lima Cord Sole & Heel Co.) J. E. Grosjean, president; F. L. Maire, vice-president; F. E. Harman, secretary; F. W. Cook, treasurer. Principal office, 447 North Elizabeth street, Lima, Ohio. To manufacture Gro-Cord rubber soles and heels.

Lynch Safety Pneumatic Automatic Tire Corp., April 21, 1920 (New York), $60,000. J. B. Lynch, W. B. Shaul, H. E. Waite—all of Syracuse, New York.

McPhillips & Co., Inc., C. F., May 13, 1920 (New York), $5,000. C. F. McPhillips, D. R. Baldwin, H. T. Hall—all of 27 Pine street, New York City. To deal in rubber.

Muller Tire & Rubber Co., Inc., The, May 5, 1920 (New York), $52,500. W. H. Muller, 128 West 129th street; H. J. Wendorf, 103 West 77th street; A. F. Tompkins, 1210 Boynton street, Bronx—all of New York City. To distribute tires, etc.

Ohio State Rubber Tire Co. of New York, Inc., May 11, 1920 (New York), $100,000. R. S. Ireland, 690 St. Nicholas avenue, New York City; R. L. DeLisser, Great Neck; E. O. Machlin, New Rochelle—all in New York. To manufacture and deal in tires.

Palladium & Rubber Co., March 24, 1920 (Delaware), $3,750,000. T. L. Croteau, M. A. Bruce, S. E. Dill—all of Wilmington, Delaware. To manufacture auto tires, etc.

Parker Collapsible Rim Sales Co., April 20, 1920 (Delaware), $1,100,000. R. K. Thistle, 65 Cedar street, A. R. Myers, R. J. Gorman—all of New York.

Phoenix Tire Mold Co., May 3, 1920 (Delaware), $300,000. M. L. Horty, M. C. Kelly, S. L. Mackey—all of Wilmington, Delaware.

Prudential Rubber & Fabric Corp., March 23, 1920 (Delaware), $27,500,000. T. L. Croteau, M. A. Bruce, S. E. Dill—all of Wilmington, Delaware.

Rawhide Products Corp., May 19, 1920 (New York), $50,000. F. Lilienthal, 1150 Broadway; R. M. Neuberger, 215 West 88th street; L. Loeb, 1475 Broadway—all of New York City. To manufacture tires and auto equipment.

Self Propelling Nozzle Co., Inc., April 7, 1920 (New York), $25,000. S. Sladden, president; H. S. Ashmun, vice-president; R. H. Ashmun, secretary. Principal office, 233 Broadway, New York City. To manufacture and sell the "Victory" self-propelling nozzle. (See THE INDIA RUBBER WORLD, September 1, 1919, page 702.)

Simpson Rubber Products Corp., April 26, 1920 (New York), $25,000. N. Ballin, 1855 80th street; H. E. Munich, 1462 Bushwick avenue, both of Brooklyn; L. Zimmerman, 68 Lewis street, New York City—both in New York. To manufacture rubber, chicle, gum, etc.

Simpson & Simpson, Inc., May 4, 1920 (New York), $1,000. N. Ballin, 1855 80th street; H. E. Munich, 1462 Bushwick avenue—both of Brooklyn; L. Zimmerman, 68 Lewis street, New York City—both in New York. To conduct a rubber brokerage business.

Synthetic Rubber Products Co., April 9, 1920 (Delaware), $3,000,000. E. W. Lohrman; A. C. Sievera, J. C. Wichman. To manufacture all kinds of rubber products.

Terrell Tire & Rubber Co., April 19, 1920 (Delaware), $1,000,000. T. L. Croteau, M. A. Bruce, S. E. Dill—all of Wilmington, Delaware. To manufacture tires.

Van Woud Rubber Co., April 10, 1920 (New Jersey), $125,000. F. and C. J. Pring, H. L. and A. D. Bruen—all of South Sixth and Bergen streets, Harrison, New Jersey. Principal office, corner of South Sixth and Bergen streets, Harrison, New Jersey. Agent in charge, H. L. Bruen. To manufacture, sell, and deal in druggists' sundries, rubber goods of all kinds, etc.

Voice Tire Exchange, Inc., May 5, 1920 (New York), $10,000. A. Voice, Passaic, New Jersey; J. H. Metz, 312 South Broadway, Yonkers; J. A. Voice, 210 Eleventh avenue, New York City—both in New York. To manufacture and deal in tires.

Wear Best Garter & Suspender Co., April 15, 1920 (New York), $20,000. M. Sternfield, W. Brill, I. M. Glickman—all of 57 East Third street, New York City.

Wonderseal, Inc., April 23, 1920 (New York), $500. L. H. Crough, 301 Columbus avenue; H. W. Frey, 1210 Clay avenue, both of New York City; S. R. Fleisher, 817 Avenue N, Brooklyn—both in New York. To manufacture a chemical compound for making tires puncture proof.

PERSONAL MENTION.

Walter J. Bitterlich, plant engineer for the Hood Rubber Co., Watertown, Massachusetts, for the last fourteen years, has accepted a similar position at the new plant of The Seamless Rubber Co., New Haven, Connecticut.

O. G. Hellner, formerly special Iowa representative of The McGraw Tire & Rubber Co., Cleveland and East Palestine, Ohio, has been placed in charge of the Iowa territory of the Globe Rubber Tire Manufacturing Co., New York City.

E. B. Thompson, former special representative of the Michelin Tire Co., Milltown, New Jersey, has been placed in charge of the central Illinois territory of the Globe Rubber Tire Manufacturing Co., New York City.

D. J. T. Kennedy, formerly advertising manager of The Mason Tire & Rubber Co., Akron, Ohio, is now assistant secretary and director of advertising and sales for the new Latex Tire & Rubber Co., Fond du Lac, Wisconsin.

C. R. Collins and Lee Folger have been elected directors of the McClaren Rubber Co., Charlotte, North Carolina.

T. S. Lindsey, until recently eastern district manager of the branches of the Kelly-Springfield Tire Co., New York City, has been appointed a special representative of the sales department.

Gladding Price, for the last two years in charge of factory compounding for the Davol Rubber Co., Providence, Rhode Island, has been appointed assistant to A. A. Somerville, manager of the rubber department of R. T. Vanderbilt Co., 50 East 42d street, New York City, and began his new duties May 1. Mr. Price was formerly with The Goodyear Tire & Rubber Co., Akron, Ohio, and with the United States Rubber Co.

Charles C. Phelps has become associated with the Uehling Instrument Co., 71 Broadway, New York City, combustion engineers and manufacturers of fuel economy apparatus. He is devoting most of his time to research work in connection with the efficient combustion of fuel oil in boiler furnaces. He is a graduate of Stevens Institute of Technology and an associate member of the American Society of Mechanical Engineers.

E. A. Oldershaw has been appointed manager of sales, in charge of the waterproofing department of the Mitchell-Rand Manufacturing Co., New York City, manufacturer of electrical insulating materials. Mr. Oldershaw has been engaged in the structural compound and waterproofing business for over fifteen years.

L. Brandenburger, formerly located in the Walker Bank Building, has taken larger quarters at 59 West Broadway, Salt Lake City, Utah. He has been recently appointed sales representative of The Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin, for the territory including Utah, the western part of Wyoming, and three-quarters of the state of Idaho.

George B. Fink, Jr., has been appointed manager of the new rubber trades department of The Chas. R. Sargent Co., Engineers Building, Cleveland, Ohio, handling a complete line of pigments, chemicals, oils and colors, and naval stores suitable for the rubber trade.

C. E. Thompson, president, and M. L. Heminway, general manager of the Motor and Accessory Manufacturers' Association, will sail for Paris on June 5, on the *Kroonland*, to represent the Association at the meeting of the International Chamber of Commerce in Paris on June 21. They will also study the conditions of the European automobile industry.

E. B. Harral has suceeded H. C. Danaher as manager of the New Orleans office of G. Amsinck & Co., Inc., New York City.

Bertram G. Work, president of The B. F. Goodrich Co., Akron, Ohio, was one of the 1550 passengers who sailed for Europe on the *Mauretania* when she left New York City, April 24.

Dr. Frederic Dannerth has recently accepted the position of chief chemist of the C. Kenyon Co., Brooklyn, New York, in charge of the chemical laboratory of the tire department at the Bay Ridge works.

John A. Horner, former branch manager of The Fisk Rubber Co., Baltimore, Maryland, has been appointed manager of the Baltimore district with headquarters in that city. Mr. Horner has been connected with The Fisk Rubber Co. since August, 1911, when he entered its employ at the Baltimore branch. In January, 1913, he was appointed salesman out of this branch and in June, 1915, was made manager of the Richmond, Virginia, branch. On January 1, 1918, Mr. Horner reported for active duty with the United States Navy, serving until January 30, 1919. He immediately reentered the employ of the Fisk company as manager of its Fort Wayne, Indiana, branch. On November 1, 1919, he returned to Baltimore as branch manager, where he has remained until the present time. Mr. Horner succeeds E. J. McLaughlin, who has been granted a leave of absence because of ill health.

J. A. HORNER.

C. A. Warren, formerly manager of the Fisk company's branch at Roanoke, Virginia, succeeds Mr. Horner as Baltimore branch manager.

Alfred Whiteway and Leonard Brown, both directors of Chas. Macintosh & Co., Limited, Manchester, England, were in the United States last month and visited rubber factories in the East and the Akron district.

MEETING OF AMERICAN SOCIETY FOR TESTING MATERIALS.

The American Society for Testing Materials will hold its twenty-third annual meeting at Asbury Park, New Jersey, on June 22-25, 1920. The reports of interest to the rubber trade will be made on Thursday afternoon, June 24, when E. A. Barrier, chairman of Committee D11, will report on rubber products, J. M. Bierer will describe a test of special steam hose, and G. B. Haven, chairman of Committee D13, will report on textile materials.

THE RUBBER TRADE IN THE EAST.

By Our Regular Correspondent.

NEW YORK NOTES.

THE LEE RUBBER & TIRE CORPORATION, New York City and Conshohocken, Pennsylvania, at the annual meeting elected the following directors: H. C. Coleman, J. Carl DeLaCour, John M. Dettra, James A. Fayne, Stephen B. Fleming, Albert A. Garthwaite, Walter R. Herrick, Horace C. Jones, Samuel H. Miller, John J. Watson, Jr., and Joseph Wayne, Jr. At the organization meeting the following officers were elected: John J. Watson, Jr., president and chairman of the board; Albert A. Garthwaite, vice-president and treasurer; Henry Hopkins, Jr., secretary; W. B. Dunlap, assistant treasurer; and John M. Dettra, assistant secretary.

The Ajax Rubber Co., Inc., New York City, recently ratified an increase in the capital stock from $10,000,000 to $20,000,000, par value $50 per share, to provide for future requirements of the business, but it is not planned to issue any of this newly authorized stock at the present time.

The Tropical Rubber Co., 365 Broadway, New York City, is a Delaware corporation organized November 6, 1917, with a capitalization of $400,000, for the purpose of manufacturing and

selling automobile tires and tubes and similar articles. Since that time the certificate of incorporation has been amended and the capitalization increased to 100,000 shares, par value $10 per share, and 100,000 shares, no par value. The officers are: George V. S. Williams, president; Henry W. Van Alen, treasurer; and F. C. Woods, secretary.

R. H. Hale & Co., 1947 Broadway, New York City, has been organized by R. H. Hale, formerly in charge of the New York City store of The B. F. Goodrich Rubber Co., to do a general business dealing in pneumatic tires of all leading makes.

William H. Stiles & Co., New York City, crude rubber brokers, have removed to No. 1 Liberty street, Rooms 1807-1809.

The Kelley Tire & Rubber Co., New Haven, Connecticut, has established its New York factory branch at 1656 Broadway, corner of 51st street, New York City.

The Firestone Tire & Rubber Co., Akron, Ohio, a West Virginia corporation, has appointed E. P. Jones its New York representative, with headquarters at 1871 Broadway, the New York City office.

A vacancy on the board of directors of the United States Rubber Co., New York City, having been caused by the decease of Theodore N. Vail, at the annual meeting of stockholders on April 20, 1920, George R. Deshler, of New Brunswick, New Jersey, was elected the twenty-fourth member. The personnel of the operating council was also elected, as follows: Charles B. Seger, chairman; Homer E. Sawyer, Elisha S. Williams, J. Newton Gunn, Ernest Hopkinson, and W. G. Parsons. The other officers elected are the same as given in THE INDIA RUBBER WORLD, May 1, 1920.

The Executive Committee of the Motor and Accessory Manufacturers' Association, New York City, at its recent meeting in Atlantic City, after a canvass of its members, adopted resolutions opposing the introduction of the metric system into American industries.

PENNSYLVANIA NOTES.

The Carlisle Tire & Rubber Co., Carlisle, Pennsylvania, is building a small addition to its factory.

The Fawcus Machine Co., Pittsburgh, Pennsylvania, has purchased an interest in The Schaffer Engineering & Equipment Co., of which the new officers are: A. F. Cooke, president and general manager; J. C. Schaffer and Eliot A. Kebler, vice-presidents; A. A. Alles, Jr., treasurer; and Waller Crow, secretary.

CONNECTICUT NOTES.

The Goodyear Rubber Company, Middletown, Connecticut, will build a three-story plant, 50 by 216 feet, to cost about $144,000.

The Beacon Falls Rubber Shoe Co., Beacon Falls, Connecticut, has recently let a contract for the building of fifty-four new houses for employes, located on what is known as the "hill." These will be sold on easy terms and are a part of the general plan of the town which the company hopes to make one of the most beautiful in the Naugatuck valley. Forty houses were built four years ago by the company in this same locality and were promptly bought by employes.

The Farrel Foundry & Machine Co., Ansonia, Connecticut, has recently authorized an issue of $1,500,000 preferred stock, of which $1,200,000 has been sold. The common stock of this company has stood at $1,200,000 for a number of years.

THE SEAMLESS RUBBER COMPANY.

THE SEAMLESS RUBBER COMPANY, INC., will soon move from the quarters it has occupied for over forty years into the new $3,000,000 factory it has built on the New Haven waterfront. The business was started in the early seventies of the last century by Charles E. Longden, a young man who had a japanning shop in Naugatuck, Connecticut. An Englishman named Collins interested him in rubber, and the two, finding water power on Longden's farm, began making seamless nipples, sewing machine rings and hollow rubber balls. Having formed a partnership with George Hine, the firm of Hine & Longden started a factory in the town of Naugatuck in 1875 and moved to New Haven two years later, when The Seamless Rubber Company was incorporated with $50,000 capital.

About the time that the United States Rubber Company was being formed, Joseph Banigan became interested in the Seamless company and became president in 1893. Three years later the control passed to George A. Alden and George M. Allerton, the former continuing as president till his death in 1904. Mr. Longden remained as superintendent till 1901. In 1917 the company came into the hands of the present management, and the officers are: F. O. Williams, president; F. W. Dodge, vice-president; W. C. Hutton, treasurer; H. W. Gordon, secretary, and J. W. Patterson, superintendent.

The present plant at Congress avenue and Daggett street, repeatedly enlarged with the company's progress, will be sold.

NEW PLANT OF THE SEAMLESS RUBBER COMPANY, INC., NEW HAVEN, CONNECTICUT.

The new plant is on the waterfront, with the New Haven harbor on one side and the New Haven railroad on the other, thereby securing direct shipment by both water and rail. The plant consists of three five-story buildings connected by one-story buildings, covering an area of 240 by 300 feet; thus providing seventeen floors above ground, 14,400 square feet to each floor, without counting basements and sub-basements. A separate power plant furnishes steam for vulcanizing as well as power, heat and light. The buildings are of concrete, steel and glass; they are fireproof, light and airy. Every piece of machinery and equipment is new and made to order and every modern method known to the rubber industry will be used. The comfort and welfare of the employes, who will number 1,500 in the new plants, have been fully considered as a roof-garden enclosed in glass, will contain a dining room, a dance hall and an auditorium.

The specialty of the Seamless company from the beginning had been medical rubber goods, and the new factory will manufacture soft and hard rubber druggists' sundries, medical and surgical goods, household goods, medicated plasters, hard rubber combs, syringes and specialties; tennis, hand, and squash balls, football bladders and other sporting goods; rubber toys, balloons and novelties; tubings for all purposes; hard and soft rubber goods for the manufacturing and assembling trades; gloves for acid, tanners, surgical, electricians' and general factory work; acid aprons, etc. The factory is the largest in the world for this class of goods and should be in operation July 1.

The Seamless Rubber Co. does a yearly business approaching $2,000,000, and makes goods for the United Drug Co., the Liggett stores, and other drug stores throughout the country.

CANADIAN NOTES.

On April 29, 1920, the directors of Ames Holden McCready Limited, Montreal, Quebec, authorized the incorporation of the Ames Holden McCready Rubber Boot Co., Limited, capitalized at $3,000,000. Light, smart fitting rubbers and rubber-soled canvas shoes will be made at the Mount Royal plant, adjoining the Ames Holden leather footwear plant, and the new factory will feature rubber boots for fishermen, farmers, sportsmen, and miners, as well as overshoes and heavy work rubbers known as lumbermen's. The Mount Royal plant is increasing its daily output to supplement next fall's lines.

The Regal Tire & Rubber Co., Limited, Sherbrooke, Quebec, has purchased an industrial and factory site in that city and is remodeling the building to meet its requirements. It is also purchasing machinery and equipments, the larger contracts for which have already been placed. The company is capitalized at $750,000, half of which is preferred and half common. Robert W. Hogg is secretary and treasurer.

The Tiger Tire & Rubber Company, Limited, 1105 Temple Building, Toronto, Ontario, has purchased the plant and equipment of the Belleville Rubber Co. at Belleville, Ontario, and added enough more equipment to enable it to manufacture 1,000 tires and tubes daily. It expects to begin manufacturing at once. The officers are: R. J. Graham, president, and Colonel L. W. Marsh, vice-president. The directors include, besides, Frank D. Law and W. A. Seward, general manager and consulting engineer, respectively, of the Oak Tire Co., Toronto. H. H. Hastings is manager. The company is capitalized at $2,000,000, of which $750,000 is eight per cent preferred stock and $1,250,000 common.

The Canadian General Electric Co., Limited, Toronto, Ontario, is making extensive additions to its plant at Peterboro, Ontario, including one to the rubber department building, 60 by 100 feet.

Scheuer, Normandin & Co., 18 St. Helen street, Montreal, Quebec, are Canadian distributers for the sporting footwear of the Hood Rubber Co., Watertown, Massachusetts, U. S. A.

The second annual convention of The National Shoe Retailers' Association of Canada and Shoe, Leather and Allied Trades Fair will be held in Montreal, Quebec, July 13-15, 1920. The following are in charge: P. A. Doig, general management; Frank Knowlton, space allotment committee; H. Gibbins, billeting; R. W. Ashcroft, publicity; and George G. Gales, entertainment.

THE RUBBER TRADE IN NEW JERSEY.

By Our Regular Correspondent.

NEWARK NOTES.

THE B. F. GOODRICH RUBBER CO. has leased the three-story and basement building at 13-15 Franklin street, Newark, New Jersey, for branch offices. The building is 53 by 100 feet and has 20,000 square feet of floor space. The first floor will be used as a show room.

Charles Frankel, of Newark, has been appointed receiver for the Ideal Wheel & Tire Co., 148 Sussex avenue, Newark, New Jersey. The receiver will continue the business and effect a reorganization. Application for a receiver was made by Marcus Robbins, holder of fifty shares of stock. Testimony showed that the company lost $12,000 in six months in the conduct of the business. The company's assets exceed its liabilities by a goodly margin.

The hearing on the rule to show cause why an involuntary bankruptcy petition should not be granted in the case of the Indian Tire & Rubber Co., New Brunswick, which was scheduled to be held in the United States District Court at Newark, New Jersey, on May 18, has been postponed indefinitely. In the Chancery Court proceedings in the same case a rule to show cause why an offer of $40,000 from Otto C. Meyer, of Newark, for all the property and assets of the company should not be accepted, is returnable shortly before Vice-Chancellor Foster at Newark.

TRENTON NOTES.

The United Tire Stores Co., of Trenton, has been incorporated under the laws of the state of New Jersey with a capital of $500,000. The company will operate a number of chain stores for the sale of tires and automobile accessories, and will take over the Fineburg Auto Tire Agency and the United Tire Co., both of Trenton, and the stores of the United Tire Co. in New Brunswick, New Jersey; Buffalo, New York; and Scranton, Allentown and Pottsville, Pennsylvania. The incorporators are Isaac Fineburg, Herman Fineburg, Samuel Fineburg and Albert F. Jemison. The principal office of the company is at 10 and 12 East Hanover street, Trenton, with Herman Fineburg in charge.

Earl R. Moore, aged 25 years, cashier of the Acme Rubber Co., Trenton, died recently after a long illness. He is survived by his widow and one son. The interment was in Riegelsville, Pennsylvania.

The Ajax Rubber Co. has purchased the entire plant and premises of the McFarland Foundry & Machine Co., situated at Mead street and Breunig avenue, East Trenton, directly opposite the Ajax works. The property consists of several factory buildings and 55,000 square feet of land. The rubber company recently erected a large addition on one side of Breunig avenue and the present purchase will place it among the largest rubber concerns in this section.

The Trenton rubber companies responded liberally to the drive conducted by the Trenton Welfare Association. General C. Edward Murray, of the Empire Rubber & Tire Corporation, W. J. B. Stokes, of the Thermoid Rubber Co., and George R. Cook, of the Acme Rubber Manufacturing Co., each gave $1,000; the Bergougnan Rubber Corporation and the Home Rubber Co. gave $500 each; the Essex Rubber Co. and Whitehead Brothers

Rubber Co. gave $250 each; the Acme, Hamilton, Luzerne and United & Globe companies gave $200 each, while the Sanhican Rubber Co. and the Woven Steel Hose & Rubber Co. contributed $100 each.

The Pocono Rubber Cloth Co., which recently purchased the plant of the Howard Demountable Rim Co., along the main line of the Pennsylvania Railroad at Trenton, is having erected one of the largest tile signs in the country. The Bergougnan Tire & Rubber Co., situated near the Pocono works, is also having a similar sign erected.

The Bergougnan Rubber Corporation, Trenton, has commenced work on an additional factory unit and a large warehouse for storing raw materials and finished products. Improvements will also be made in the interior arrangement of the present model plant to facilitate economy in manufacture.

The Thermoid Rubber Co., Trenton, announces that its capital stock will be increased from $1,650,000 to $5,000,000 so that the company may increase its plant and expand its business. The company is now building a $500,000 addition to the works on Whitehead's road, to be completed by early fall. It is one unit of what will eventually be an entirely new factory for the concern in which brake linings and other products will be manufactured. W. J. B. Stokes, J. Oliver Stokes, Robert J. Stokes and Fred Wilson are the owners of the Thermoid company.

MISCELLANEOUS NEW JERSEY NOTES.

The Cooper-Hewitt Electric Co. of Hoboken, New Jersey, which was amalgamated with the General Electric Co. last year, has bought land adjoining its plant, which will more than double its floor space. Business has more than doubled.

Hermann Weber, scrap rubber dealer, representing J. Schnurmann, Tottenham, England, has combined his offices, formerly at 30 Church street, New York City, with his warehouse at Newark and Jackson streets, Hoboken, New Jersey, where all correspondence should be addressed in future.

The Reliance Tire & Rubber Co., Keyport, New Jersey, has appointed A. H. McIntyre sales manager.

The Ajax Rubber Company, Trenton, has just begun the construction of a four-story brick addition to the plant to cost $60,000. It is at North Olden and Breunig avenues, and will be 60 by 100 feet. The ground floor will be used for offices and the upper floors as a welfare department for the employes. There will be an assembly room for the men and also a cafeteria. Part of the structure will also be used as a store-room for finished goods awaiting shipment. The firm now employs 1,000 hands and will have employment for many more when the plant is finished.

The pensioned employes of the United States Rubber Co. held a reunion recently as guests of the company in the recreation hall of the New Jersey factory at New Brunswick. The chief features of the occasion were a tour of the plant, a musical program and a supper. Addresses were made by Seymour Hadaway and A. T. Hopkins, of the Central Service Department of the company.

THE RUBBER TRADE IN RHODE ISLAND.

By Our Regular Correspondent.

GENERAL CONDITIONS in Rhode Island rubber manufacturing circles have remained practically unchanged during the last few weeks, all the concerns having good orders ahead and capacity operations being reported. The easing up of the transportation situation has caused the manufacturers less worry during the past month about their supplies of fuel and raw materials.

Wages of the operatives in the rubber factories of the state continue to be a serious problem with the management of the various plants, and not withstanding the fact that the present schedules are more than double the scale ever paid previously, the tendency is still upward with apparently "no limit but the sky" in the estimation of the employes. How much longer this is going to keep the manufacturers on nettles and the workmen unsettled, it is difficult to foretell.

Early in May new schedules went into effect at several of the subsidiary plants of the United States Rubber Co., including the National India Rubber Co. at Bristol, with its 4,500 employes, and the Alice Mill of the Woonsocket Rubber Co. at Woonsocket and the Millville Mill of the same concern, at Millville, having 1,600 and 600 employes, respectively. In this adjustment particular consideration was given to the earnings of employes whose wages were lower than the average, it was stated. This increase, which is the second that has been granted by the corporation in the past six months, adds a considerable amount to the yearly payroll.

Following immediately upon the announcement of this increase in wages came an announcement that the employes of the National plant at Bristol and the two plants of the Woonsocket Rubber Co. will receive a week's vacation without loss of pay this summer. This action, it was stated, was taken as a part of a plan to give, if possible, all employes continuous employment during the entire year. In the past the plants have closed down about two weeks every summer and the employes have received no pay during such periods of idleness. According to the present plans the plants referred to will close July 31 and reopen August 9. Pay for the week's vacation will be given to the workers in the first pay envelope received in August after the vacation period.

One of the outgrowths of the automobile industry is the demand for textile productions for use in the manufacture of tire fabrics. The rapid growth of this branch of the textile industry of this State is plainly indicated by the great expansion that is constantly being made by the corporations engaged in this line of production. Not only are large additions being erected to the cotton manufacturing plants in all sections of Rhode Island, but substantial increases are being made to the capitalization of the concerns. One of the most noticeable of these is the Jenckes Spinning Co. of Pawtucket, which is not only expanding its plant to several times its capacity of a few years ago, but has increased its capitalization from $3,000,000 to $20,000,000. This increase makes the Jenckes Spinning Co. the largest capitalized corporation in Rhode Island engaged in any line of industry. The corporation has now issued common stock to the amount of $2,000,000 and preferred stock to the amount of $4,500,000, leaving a balance of $13,500,000 for later issuance.

Notwithstanding the great expansions that are being made by the textile concerns engaged in fabric production for tire purposes, the production is said to be far from adequate to meet the increasing demands. The shortage in the supply of long staple cotton and the lack of spinning capacity is directly responsible for the present price of tire fabrics. The cotton mills have not been able to keep pace with the tire industry, due to the lack of loom manufacturing during the war and to the unsettled conditions of labor in the cotton centers. Not only were there no looms built during the war but the manufacture of a single loom requires at least a year. The first of these manufactured since the armistice have just come into production and these new ones are relieving those looms worn out by the constant strain of the past fifteen months, which were the heaviest in history. It will be months before the spinning capacity of the mills will be equal to the demand for tire fabrics.

The premises of the Mount Hope Spinning Co., at Warren, Rhode Island, have been the scene of great activity during the last month or six weeks, because of the extensive alterations and additions, as well as other improvements to the plant that are now under way. Although a new mill was finished last summer and another is now approaching completion, the company is

planning another addition to be constructed immediately. This latest addition to the new structure erected last summer in the rear of the original plant will be 70 feet in length and 40 feet wide, two stories high and will connect the new mill now being completed with last summer's annex to the old plant.

The National India Rubber Co., at Bristol, Rhode Island, is steadily shifting its power plant from coal to oil burning, 12 of its 15 large steam boilers having already been so changed. There are, however, five more of the boilers to be connected with the oil supply tank before the whole of the boiler department of the company's plant is fitted for burning oil for fuel purposes. This company is considering the practicability of establishing a branch of its factory at Newport, and a building on Thames street which would be available for the purpose was inspected recently by Mr. Pollock of the National Co.

Several changes have recently occurred among the department heads at the National India Rubber Co., Bristol, Rhode Island, Charles R. Caldwell, foreman of the printing department, has recently resigned and been succeeded by Samuel Simpson.

Harlowe S. Waite has been elected a vice-president and director of the Revere Rubber Co., Providence, in recognition of his many years of faithful and efficient service as factory manager.

The Davol Rubber Co.'s business continues to increase in volume and already the plant has been expanded until all the space available at the present site in Providence has been occupied. The company has recently secured the Simmons building and is to occupy this entire structure as soon as it is vacated and alterations can be made to meet the company's requirements.

The Alice Mill Employes' Association has turned over to the trustees of the Woonsocket Hospital $154.53, the net proceeds of the recent ball given by that association for the benefit of the hospital.

DAVOL SALES AND ADVERTISING MANAGER.

RAYMOND J. FRIES, sales and advertising manager and a member of the executive council of the Davol Rubber Co., Providence, Rhode Island, was born in Trenton, New Jersey, in 1876. After attending the grammar schools and graduating from the high school in New Rochelle, New York, in 1894, he entered the employment of the Kearney & Foot Co., file manufacturers, as stock clerk. Later he became superintendent of the Foot Manufacturing Co., maker of polishing supplies, and then organized the New York Buff Co.

RAYMOND J. FRIES.

It was in 1905 that Mr. Fries first became connected with the rubber industry as stock clerk in the New York City store of The B. F. Goodrich Co., later being promoted to sundries salesman in New York. In 1907, upon the death of H. L. Doherty he went to the Davol Rubber Co. as salesman, and later managed the New York City office of the company until 1917, when he moved to Providence as advertising manager, and was made sales and advertising manager in 1919.

Mr. Fries designed and planned the now well-known line of "Superservice" goods of the Davol company, and made the first use in the sundries trade of the folding or knock-down package for flat goods, now almost universally used.

THE RUBBER TRADE IN MASSACHUSETTS.

By Our Regular Correspondent.

BOSTON NOTES.

TIRE ADJUSTERS from all over New England, representing The B. F. Goodrich Rubber Co., met at the Copley Square Hotel, Boston, recently and discussed methods of standardizing tire adjustments. Frank G. Harrison, Jr., district manager of sales service presided, and devoted much of the morning to instruction. Fred T. Moore, district manager, also spoke. In the afternoon the convention adjourned to the Exeter Theatre, where the delegates viewed "Striking Tires," an amusing cartoon motion picture recently released by the Goodrich company in the interest of tire conservation.

The week of May 17 was observed as "ship by truck" week all over the country. With bands playing and motors chugging, a caravan of nearly fifty motor trucks, including army and navy contingents, made a three-days' run from Boston which covered about 170 miles. The object, was to bring to the attention of business men the value of shipping goods by motor truck, particularly in these days when our transportation systems are so badly tied up. The route included Cambridge, Somerville, Chelsea, Revere, Lynn, Salem, Haverhill, Lawrence, Lowell, Worcester and back to Boston. The caravan attracted much attention along the route, especially in the cities visited, where stops were made for addresses of welcome by city officials and talks on the value of motor trucks by some of those on the tour. H. H. Davis, of the Firestone Tire & Rubber Co., was in charge of the tour.

During the recent freight embargo due to striking railroad operatives, the United States Tire Co. and several other rubber firms sent trucks over the road to their factories for tires in order to supply the demands of the Massachusetts territory.

Robert C. Freeman, for several years manager of truck tire sales in the New England district for The B. F. Goodrich Rubber Co., now heads his own concern, the Goodrich Tire Service Co., 66 Broadway, Boston, which is a distributing agency for Goodrich solid and pneumatic truck tires and Diamond pneumatic tires. He has associated with him Nathaniel A. Finkelstein, also an experienced truck tire man, having successfully distributed Goodrich tires in Boston under the firm name of the Commercial Tire Service Co., at 118 Dover street.

V. J. Mulherin, 825 Boylston street, Boston, is New England distributor for Howe tires and tubes.

Guy D. Niles, formerly Boston representative for the Portage Rubber Co. and the Gillette Tire Co., has been appointed manager of the Boston branch of the Lee Rubber & Tire Corporation by Harry E. Field, vice-president and general manager of the latter company. When Mr. Field was vice-president and sales manager of the Hartford Rubber Works Co., ten years ago, Mr. Niles was beginning his career as a tire salesman for that company. A. H. Robinson succeeds Mr. Niles as manager of the Gillette branch.

A. H. McIntyre has resigned as Boston manager of the Fulton Truck Co. to become sales manager of the Reliance Tire & Rubber Co., Keyport, New Jersey. Mr. McIntyre is secretary of the Bay State Automobile Association and one of the best known automobile men in New England. This is the second time within a few months that a rubber company has selected the secretary of this association for a responsible position, his predecessor, W. O. Durrell, having joined the Goodyear forces at Akron a short time ago.

Ellsworth E. Leach, manager of mechanical sales of The B. F. Goodrich Rubber Co., Boston, on May 1, rounded out twenty years of loyal and faithful service and the sales force and department managers of the company remembered the anniversary

by giving a dinner in his honor and presenting him with twenty $20-gold-pieces, one piece for each year of service. Mr. Leach has a very wide acquaintance in the trade among buyers of rubber goods and he has played an important part in guiding the destinies of the Goodrich company in this part of the United States.

The R. W. Harris Tire & Rubber Co., 737 Boylston street, Boston, is agent for Oldfield cord tires in this territory.

V. J. Mulherin, of the Howe Rubber Co., 825 Boylston street, Boston, is in charge of the New England distribution of Howe tires and tubes.

MISCELLANEOUS MASSACHUSETTS NOTES.

The Boston Woven Hose & Rubber Co., Cambridge, has received from the United States Government a distinguished service citation and certificate of merit for its services during the war. In congratulating the employes on the important part played by them in this matter the management emphasizes the importance of continuing the same initiative, energy and industrial productivity in times of peace.

The Boston Woven Hose & Rubber Co., Cambridge, is establishing a self-service cafeteria with a seating capacity of 250 for its employes. A good variety of wholesome food, drinks, smokes and ice cream will be sold without profit.

With eyes open to the gravity of the food situation, the officials of the Monatiquot Rubber Works Co., South Braintree, Massachusetts, have this year placed at the disposal of their employes a good-sized tract of the company's land for gardening purposes. As much interest is being shown in "peace" gardens as was evinced in "war" gardens when America first entered the great conflict. The spirit of rivalry is being encouraged and it is expected that the present enthusiasm will be maintained through the harvest season.

The second "get-together dinner" of the employes of the Tyer Rubber Co. was held at the November Club House, Andover, Massachusetts, on the evening of April 20. The seventy-five employes present were all of the delegates and alternates of the Tyrian Service Committee, the representative committee of the employes; all of the foremen, and the committee members of the management. During the dinner a musical program of songs and orchestral selections was rendered by the Tyrian Mixed Quartette, by soloists from among the membership, and by the Tyer Rubber Company orchestra. Following the dinner, informal remarks were made by several members of the committee, and Mr. Jones, the treasurer and general manager, paid a tribute to Mr. Carlton, the late purchasing agent of the company.

THE RUBBER TRADE IN AKRON.

By Our Regular Correspondent.

AKRON NOTES.

THE POPULATION of Akron, the rubber center of the world, has been announced as 208,435 persons, as compared with a population of 69,000 persons ten years ago. This is an increase of 208.1 per cent.

The history of the growth of the city of Akron into the "larger city" class is the history of the rubber industry. For although the city had three sound and growing industries when the automobile industry opened a new field for the rubber products then made in a small way in the city, it was the tire industry which made possible the expansion of the industry which in turn made the city what it is today.

The city grew, however, because it had industrial leaders who were ready to take advantage of the situation. As was pointed out in THE INDIA RUBBER WORLD several months ago, Akron has few natural advantages which should make it the center of the rubber world.

When Dr. B. F. Goodrich came to Akron in 1869, after having failed to organize the rubber industry in the East, the business men of Akron were ready to take a chance and backed him with sufficient capital to erect a 40 by 100-foot shop, in which he began the manufacture of rubber goods.

Although the succeeding years were hard ones, the men who backed him did not lose faith, and when the bicycle wave swept over the country these same and other men were ready to advance a greater capital to make it possible to furnish tires for the bicycles.

When the bicycle tire demand had been met by the rubber industry and no further fields seemed available, came the invention of the automobile and the necessity for rubber tires of larger sizes, and again the business men of the city backed the increased plants and the rubber industry of the city set the pace in the manufacturing of automobile tires. In every instance it was a case of men having faith in their own judgment of the future and being ready to back their judgment with their money.

At the present time the capitalization of the 22 rubber plants in Akron is placed at $227,119,275 by the Chamber of Commerce in official publications, the number of men and women employed in the industry at approximately 75,000, manufacturing $427,796,317 worth of goods a year and having a pay-roll of $101,178,591 a year.

In the history of the development of the city the names of Goodrich, Seiberling, Firestone, Work and Gammeter stand out. The rubber industry is so young that the men who were instrumental in founding the business are still at the helm at the period of its larger expansion.

The future of Akron appears as bright as it did five and ten years ago. Men familiar with its history and prospects do not hesitate to place the ultimate population at 500,000 with the same confidence with which they placed it at 200,000 by 1920 two and three years ago.

The war brought to Akron the beginning of what is considered by rubber men as the next great industry—dirigibles and airplanes.

The manner in which Akron men have taken to the new industry is similar to the manner in which they grasped former opportunities, and if the industry develops as anticipated it will be found in ten years that Akron will be one of the centers of aviation.

A flying club having approximately two hundred members has been organized in the city and efforts will be made to increase this membership. The club is being fostered by the large manufacturers, and a local company has given enough land for a hangar near the city.

John Gammeter, one of Akron's pioneer bird men and head of the experimental department of The B. F. Goodrich Co., is one of the leaders in the new club. Mr. Gammeter was recently elected president of the flying clubs of the state of Ohio at a convention held at Columbus.

The B. F. Goodrich Co. has taken out a building permit for a factory building to cost approximately $400,000. The company now has more than $1,000,000 worth of building under way.

C. D. Studebaker has been appointed district sales manager of The B. F. Goodrich Co. for the Akron territory, which includes Cleveland, Youngstown, Erie and Pittsburgh. Mr. Studebaker started with the company as a New York salesman.

Only six persons wear the Goodrich 25-year service pins. Of the 157 pioneers, 126 wear the 10-year service pin and 26 the 15-year service pin.

The Miller Tire & Rubber Co., Akron, will continue its Americanization classes until the middle of June. Mrs. Louise F. Copp has been appointed plant director of the work in this department and five employes of the company recently received certificates showing that they had completed 75 or

more hours of class work during the last term. Two diplomas have also been awarded to employes.

Edward S. Schlegel, of Youngstown, formerly with the Ohio Industrial Commission, has been named safety manager of The Miller Rubber Co., Akron.

Theodore E. Smith, publisher of "The India Rubber Review," has been elected president of the Rotary Club for the ensuing year.

Major A. G. Stevens, formerly in the highway transportation service of the Council of National Defense, has been made head of the highway transport division of the Goodrich Travel and Transport Bureau, Akron, Ohio, of which Raymond Beck is chief.

MAJOR A. G. STEVENS.

Before entering government service Major Stevens was engaged in railroad tariff compilation and, therefore, he was placed in charge of the section of the finance division of the War Department which issued railroad freight charges. After the war he was assigned to the Council of National Defense to make a comprehensive survey of highway transportation throughout the country. He compiled data showing the comparison between railway, waterway, and highway rates, and obtained reports relating to motor express development and operating costs.

In his present work Major Stevens will correlate all available information on highway transportation, make analyses of engineering features of motor trucking, and issue bulletins containing a digest of all matters of interest.

In order to supply fabric for local rubber mills approximately 500 trucks were hired in the East by Akron rubber factories to bring it over the road from eastern mills. One train, guarded by armed men, brought in 40 cars of fabric. The trucks made the trip at the rate of 100 miles a day and were paid at the rate of $1 a mile.

The Goodyear Tire & Rubber Co. has announced that the factory will work only five days a week because it is impossible to make shipments, due to the railroad situation created by the switchmen's strike.

The Goodyear Tire & Rubber Co. has made an arrangement with the federal postal authorities whereby the Government will move the East Akron post office into a building to be constructed at a cost of $250,000 by the Goodyear company. The building will have 7,000 feet of floor space.

The Goodyear engineering department will soon move into a new five-story building which is now being completed.

Fred Fuller, assistant manager of the labor department of The Goodyear Tire & Rubber Co., was given a desk chair by Goodyear "silents" before he started to Los Angeles to work in the Goodyear plant there. The division heads of the labor department presented him with a loving cup at a dinner tendered him at the City Club recently.

During the third week of May a "ship by truck" tour was conducted by the Firestone Tire & Rubber Co. to the smaller cities and towns near Akron. It was part of the national movement to further the "Ship by Truck Movement."

Although no definite figures are available, safety managers of the various rubber factories here state that accidents were reduced at least 50 per cent during the safety campaign conducted by Akron industries during the week of May 2-9. All the large factories conducted separate campaigns in their plants.

The fact that rubber overshoes and rubbers cannot at present be purchased in Akron retail shoe stores, when they are located in the rubber goods center of the world, is considered as a huge joke.

At the annual meeting of stockholders of The B. F. Goodrich Company, Akron, held March 15, 1920, the following six directors were elected for a term of three years: D. M. Goodrich, New York City; H. Hough, Akron; C. B. Raymond, Akron; H. E. Raymond, New York City; E. C. Shaw, Akron, and F. C. Van Cleef, Akron.

The by-laws were also amended, changing the time of holding the annual meeting of the stockholders from the second Wednesday of March to the third Wednesday of April, beginning in 1921.

At the organization meeting of the directors held immediately after the stockholders' annual meeting on March 15, the following officers were elected for a term of one year: B. G. Work, president and chairman of board of directors; H. E. Raymond, vice-chairman of board of directors; vice-presidents—C. B. Raymond, W. A. Means, H. K. Raymond, W. O. Rutherford, A. B. Jones and W. C. Geer; F. C. Van Cleef, secretary; L. D. Brown, treasurer and assistant secretary; H. Hough, comptroller; H. C. Miller, director, tire sales; C. E. Cook, director, mechanical sales; W. C. Arthur, assistant secretary; V. I. Montenyohl, assistant treasurer, and L. L. Smith, assistant treasurer.

MISCELLANEOUS OHIO NOTES.

W. R. McCarty, who recently assumed the duties of sales manager for The Standard Tire Co., Willoughby, Ohio, maker of "Tiger-Foot" cord tires, has been connected with several of the large tire companies. For a number of years he served as branch manager for such well-known organizations as the Firestone Tire & Rubber Co., The Rubber Products Co. and The Portage Rubber Co. His activities have always been confined to sales, and he is widely known in the trade as an organizer and executive.

W. R. MCCARTY.

Sales of the Mason Tire & Rubber Co., Kent, Ohio, amounted to $1,067,000 during the first three months of 1920. The Mason fabric mill was scheduled to begin operations on May 15.

The Mason Tire & Rubber Co., Kent, Ohio, is making extensive plans for housing the increased number of employes due to the extension of the tire plant and the starting of the cotton fabric mills. One of the plans calls for a group of three units facing a court which will have a fountain, flower beds, trees and shrubbery. There will be twenty-three five-room suites of the duplex type, each being planned to accommodate six or eight girls or a family of four or five. A community hall will give opportunity for social events. The construction is brick, tile and stucco, and the buildings will be heated from a central plant.

The Barr Rubber Products Co., Lorain, Ohio, has recently completed its new factory for the manufacture of toy balloons, bathing caps, etc., and have it fully equipped for production June 1. Nelt Barr, formerly of Ashland, Ohio, now of Lorain, is president and general manager. The other officers are: John Dorn, vice-president; W. H. Adams, secretary and treasurer.

The Lima Rubber Co., Lima, Ohio, changed its name on April 28, 1920, to the Lima Cord Sole & Heel Co. The officers are J. E. Grosjean, president; F. L. Maire, vice-president; F. E. Harman, secretary; and Fred Cook, treasurer. The company manufactures the "Gro-Cord" sole and heel, described elsewhere in this issue.

B. E. Aaronson, special sales representative of the Mohawk Rubber Co., Akron, Ohio, for the last three years, has succeeded M. S. Lines as sales manager of The Gordon Tire & Rubber Co., Canton, Ohio.

On March 31, 1920, The Mason Tire & Rubber Co., Kent, Ohio, absorbed The Mason Cotton Fabrics Co., this now being known as the textile division of the rubber company. The rubber company's estimated sales for the quarter ended April 30 are between $2,000,000 and $2,500,000.

The Mansfield Tire & Rubber Co., Mansfield, Ohio, has elected the following officers for the ensuing year: C. R. Grant, president; G. W. Stephens, first vice-president and general manager; P. H. Ober, second vice-president; J. E. LaDow, secretary; Charles Hoffman, treasurer; and Carl L. Willsey, assistant treasurer. The directors include all of the above and A. J. Reynolds in addition.

The Cincinnati Rubber Manufacturing Co., Cincinnati, Ohio, is building an addition to its factory, 55 by 246 feet, and a further extension is planned. The company recently increased its capital stock to $1,500,000, of which $500,000 is preferred.

The Universal Film Manufacturing Company, New York City, sent out invitations recently to those who might be interested in viewing a series of motion pictures visualizing the production of tires from the raw material to the finished product. The pictures were shown at the Broadway Theatre, 41st street, under the joint auspices of the educational department of the film company and The Goodyear Tire & Rubber Company. The pictures were taken on the Goodyear plantation in Sumatra and in its factory in this country.

John Miller, for the last seven years with The Faultless Rubber Co., Ashland, Ohio, has been appointed factory superintendent of The Barr Rubber Products Co., Lorain, Ohio.

The Ashland Tire & Rubber Co., Ashland, Ohio, is erecting, back of its main factory building a structure 100 by 120 feet for miscellaneous storage, reclaiming plant, and cement room.

The Columbus Tire & Rubber Co., Columbus, Ohio, has recently increased its capital stock to $1,275,000.

The Lima Rubber Co., Lima, Ohio, has changed its name to The Lima Cord Sole Heel Co. The officers are: J. E. Grosjean, president; F. L. Maire, vice-president; F. E. Harman, secretary; and F. W. Cook, treasurer. The company manufactures a cord-fabric sole and heel described elsewhere in this issue.

The Gordon Tire & Rubber Co., Canton, Ohio, has elected the following officers for the ensuing year: H. B. McMaster, president; C. W. Keplinger, vice-president; and C. J. Keplinger, secretary and treasurer. B. E. Aaronson is sales manager and C. E. Jaynes is purchasing agent, while George A. Bockius is equipment engineer.

The plant of The Oak Rubber Co., Ravenna, Ohio, which was totally destroyed by fire on March 15, is being rebuilt to include two units, 40 by 200 feet and 60 to by 200 feet, respectively, and a power unit 40 by feet. The construction is reinforced concrete, and a sprinkler system and special equipment for fighting fires will be installed. The company manufactures dipped rubber specialties and toy balloons. New machinery will be installed so that production may begin in August.

The L. & M. Rubber Co., Carrollton, Ohio, has changed its name to The Tuscan Tire & Rubber Co. and increased its capital to $1,000,000, with the same officers as before, namely: T. J. Saltsman, president; J. H. Richards, secretary; and H. J. Richards, general manager. C. W. McKone and A. W. Senz, formerly with The Gordon Tire & Rubber Co., Canton, Ohio, have become associated with the Tuscan company, Mr. Senz being sales manager. Two lines of tires will be manufactured, the Tuscan which is an air-bag tire in both cord and fabric, and the Buckskin which is a molded tire in fabric and air-bag in cord. The latter is to be for the development of the jobbing trade exclusively.

The Imperial Rubber Co., Orrville, Ohio, has recently been incorporated in that state, at $25,000, to manufacture toy balloons at first and later, rubber sundries and specialties. The concern has purchased the J. D. Mullet Building, on Pine street, until recently occupied by the Glamorgan Rubber Co. The incorators of the new company include Fred F. Flinn, of Ashland; S. S. Hobbs, of Oberlin; H. H. Hoberg, of Ravenna; H. A. Flinn, J. D. Mullett, and Fred S. Gill, of Orrville. H. Hoberg will be general superintendent.

The Cascade Tire & Rubber Co., Ravenna, Ohio, has elected the following officers: Harry C. Thomas, president; E. W. Davis, vice-president; S. G. Abbott, secretary and treasurer.

The Excel Rubber Co., Wadsworth, Ohio, has recently completed its new factory, 112 by 180 feet, two stories in height, with two wings 60 by 40 feet, of brick and steel construction. Machinery is being installed and production will begin at an early date. Three kinds of tires will be made, namely, a high-class fabric tire, a high-class cord tire, and a medium-priced tire, as well as accessories.

The Master Tire & Rubber Co., Dayton Ohio, has increased its capitalization from $300,000 to $1,000,000 in order to erect a six-story building to increase its capacity to 2,000 tires daily.

The McGraw Tire & Rubber Co., Cleveland and East Palestine, Ohio, has elected the following new officers: E. C. McGraw, president; John Morgan, vice-president and treasurer; R. W. McGraw, vice-president; L. M. Kyes, secretary; and H. C. Johnston, assistant secretary.

The Reynolds Machine Co., Massillon, Ohio, has appointed Frank B. Longnaker general supervisor of its tire mold, core, and rubber mill equipment department which it has recently established. Mr. Longnaker was formerly general superintendent and sales manager of The Banner Machine Co., Columbiana, Ohio, manufacturer of tire molds and equipment, and also with The Goodyear Tire & Rubber Co., Akron, for eight years, in charge of its machine shop.

CLEVELAND NOTES.

The Malay Rubber Co., 1034 Guardian Building, Cleveland, has been organized to manufacture Malay tires. The officers are: Charles L. Blatz, president; Owen Moynihan, vice-president and general manager; R. L. Queisser, treasurer; and E. E. Sprague, secretary.

The Ideal Tire & Rubber Co., Cleveland, will increase its output of Greyhound tires to 300 a day, beginning June 1.

The India Tire & Rubber Co., Akron, has opened a branch at 65th street and Carnegie avenue, Cleveland, Ohio, in charge of Ode Russ.

The Wellman-Seaver-Morgan Co., manufacturer of rubber factory equipment and special machinery, on March 31 removed its Akron office in charge of L. N. Ridenour to its general offices at 7000 Central avenue, Cleveland.

The Ætna Rubber Co., 811-815 East 79th street, Cleveland, is specializing on hard rubber molded goods for batteries. The company has recently been reorganized and the capital stock increased to $300,000. A factory addition is planned in which additional machinery will give the concern three times its present production.

The D. & M. Cord Tire Co., Cleveland, has changed its name to The Denman-Myers Cord Tire Co. Walter R. Denman is secretary and general manager.

"The Rubber Age and Tire News" and "Tire Trade Journal," New York City, have established an office at No. 828 The National City Building, Cleveland, in care of F. H. Van Horn.

THE RUBBER TRADE IN THE MID-WEST.

By Our Regular Correspondent.

MID-WEST RUBBER MANUFACTURERS' ASSOCIATION.

THE MAY MEETING of the Mid-West Rubber Manufacturers' Association was held on the 11th of last month at the Chicago Athletic Club with sixty members present. The following new members were admitted:

REGULAR MEMBERS.

The Sebring Tire & Rubber Co., Sebring, Ohio.
The Carey Tire & Rubber Co., Carey, Ohio.
The Monarch Rubber Co., Canton, Ohio.
The Porter Rubber Co., Salem, Ohio.
The Knox Tire & Rubber Co., Mount Vernon, Ohio.
Ardmore-Akron Tire & Rubber Co., Oklahoma City, Oklahoma.

ASSOCIATE MEMBERS.

Allen Machine Co., Erie, Pennsylvania.
Wishnick-Tumpeer Chemical Co., Chicago, Illinois.
The Barrett Co., Chicago, Illinois.
"The Tire Rate Book," New York City.
H. A. Astlett & Co., New York City.
Bankers' Audit & Appraisal Co., Chicago, Illinois.

Last month the Association sent out a good deal of literature to its members for their guidance and information, notably: a weekly review of the crude rubber market; lists of articles and material wanted or for sale; reports on special subjects, like the coal situation; and notification of important news, as the meeting of the Reserve Board directors to consider the restriction of credits.

MID-WEST NOTES.

After being located 27 years at 160 West Jackson Boulevard, Chicago, Illinois, A. W. Smith, western representative of the Goodyear's India Rubber Glove Division of the United States Rubber Co., has removed to Room 917, 115 South Dearborn street.

The Chicago branch of the Star Rubber Co., Akron, Ohio, is in charge of E. A. Peterson.

The J. W. P. Tire Co. has been organized at Scottsburg, Indiana, with W. L. Hubbard as president, to manufacture a pneumatic tire. The company expects to build a factory soon.

The Zonta Tire & Rubber Co., 404 Iowa Building, Sioux City, Iowa, has begun the construction of a $350,000 plant at 3100 Floyd avenue, Sioux City, where it is expected to begin manufacturing about October 1 of the present year. The officers of the company are: T. P. Scott, president; Fred Bartelt, vice-president; H. W. Caldwell, secretary, and F. J. Simmons, treasurer.

The Pawnee Tire & Rubber Co., Waterloo, Iowa, which was incorporated under the laws of the State on July 18, 1919, with $1,000,000 eight per cent cumulative participating capital and $500,000 common, has recently purchased a building at Cedar Falls, containing 36,000 square feet of operating floor space, besides a two and one-half-story office building and two two-story storage buildings, and plans to begin manufacturing in the autumn. The officers of the company are: E. D. Flynn, president; Charles F. Sawyer, vice-president and general manager; William J. Murphy, treasurer; and E. J. Murphy, secretary. These, with E. D. Flynn, Jr., also compose the board of directors.

The W. A. Shaeffer Pen Co., Fort Madison, Iowa, manufacturer of fountain pens, etc., has increased its capital stock from $1,500,000 common and $75,000 preferred to $1,500,000 common and $2,500,000 preferred, making a total of $4,000,000.

The factories of the Wildman Rubber Co. will be located at Bay City, Michigan, where it has acquired 63 acres of land with a frontage of half a mile on the Saginaw river and its deep water channel. The Michigan Central and Grand Trunk railroads run through the property and electric power is available from the plants of the Commonwealth Power on the Au Sable river and other sources. A modern factory will be erected here and the first unit will be capable of turning out 2,500 tires and 5,000 tubes daily. W. W. Wildman, Detroit, who has had nearly a quarter of a century of experience in the rubber business, is president and general manager; L. C. MacGregor is vice-president; and C. R. Twynham is secretary-treasurer. All three were formerly with the Portage Rubber Co., Akron, Ohio. The office of the Wildman company is at 817 Book Building, Detroit, Michigan.

The Ajax Rubber Co., Inc., New York City, has appointed L. M. Van Riper district manager with headquarters in Detroit, Michigan. His territory includes a considerable portion of northern Ohio.

The Curtis Tire & Rubber Co.'s plant at Muskegon, Michigan, was entirely destroyed by fire last month.

A. G. Spalding & Bros., sporting goods dealers, have removed from 415 North Seventh street, St. Louis, Missouri, to 823 Locust street, opposite the downtown postoffice, in the shopping district.

At the annual meeting of the stockholders of the Premier Tire & Rubber Co., Kansas City, Missouri, the following directors were elected: J. G. Joce, Carter Wilder, C. R. Renolds, A. J. Woodring, C. A. Wooley, Walter Maloney, and B. J. Riser. The capital stock was also increased from $300,000 to $1,500,000 and a stock dividend of 100 per cent declared on all outstanding stock. The company is now building 50,000 square feet of floor space.

The Surety Tire & Rubber Co., St. Louis, Missouri, is perfecting plans for the production of 1,000 Sternwear casings daily. William L. Burgess is vice-president and general manager.

The Rawlings Manufacturing Co., St. Louis, Missouri, manufacturer of game balls, has leased the two-story building at the northwest corner of Twentieth and Locust streets for two years, and will occupy the premises temporarily until the completion of the addition to its factory on a 50-foot lot west of the present factory on Lucas avenue. W. P. Whitley is vice-president and general manager.

The Overland Tire & Rubber Co., Omaha, Nebraska, has promoted F. C. Rudisell from the position of secretary and sales manager to that of general manager.

The Black & Decker Manufacturing Co., Towson Heights, Baltimore, Maryland, has established a permanent office and show room for the display of its portable electric tools and special machinery at 1436 South Michigan avenue, Chicago, in charge of R. G. Ames, whose territory will include the entire Mid-West. He will be assisted by F. E. Marrion and J. N. LaBelle.

The Stanwood Rubber Co., 9 East 40th street, New York City, and Elizabeth, New Jersey, has opened a Chicago office at 1712 South Michigan avenue, in charge of J. H. Greer, who is district manager of both the Stanwood company and of the Hardman Tire & Rubber Corporation, Belleville, New Jersey.

The Zeglen Tire & Rubber Co., Inc., 118 North La Salle street, Chicago, Illinois, a newly incorporated company, has purchased the plant of the Century Rubber Works at Elston and Rawson streets, Chicago, and expects to start producing a one-ply interwoven tire under its own patents about July 1. John B. Drish is acting president and vice-president and Frank J. Kolodzinski is secretary and treasurer.

The Burdick Tire & Rubber Co., Chicago, Illinois, has removed from the Consumers' Company Building to 10 South La Salle street. The present officers are: Henry G. Steinbrenner,

president; Frank E. Teachout, vice-president and general manager; and Harlow P. Steinbrenner, secretary and treasurer. The new factory of the company at Noblesville, Indiana, is of reinforced concrete throughout and has a floor space of 66,000 square feet. It is three stories high.

The Sewell Cushion Wheel Co., Detroit, Michigan, has purchased property at 2711-2717 South Wabash avenue, Chicago, 80 by 190 feet, on which it will erect a one-story building with a foundation to carry a second story. A portion of this structure will be used for Chicago service and the balance for manufacturing and assembling. The total investment, including machinery, will be $75,000.

At the annual meeting of the American Zinc Institute, in Chicago, where Charles M. Schwab, who has become interested in zinc, was a speaker, the following officers were elected for the ensuing year: president, E. H. Wolff, of the Illinois Zinc Co., Peru, Illinois; first vice-president, J. L. Bruce, of the Daly Travis Copper Co., Butte, Montana; second vice-president, Edgar Palmer, of the New Jersey Zinc Co., Inc., New York; third vice-president, F. C. Wallower, of Joplin, Missouri. The next meeting will be held in St. Louis.

The National Association of Waste Material Dealers, Inc., notifies its members that the classifications covering rubber expire July 1, and new ones become effective for one year from that date. Members are requested to notify the secretary of any changes they wish to have considered at the June meetings.

The Wishnick-Tumpeer Chemical Co., North Pier Terminal, 365 East Illinois street, Chicago, was incorporated May 4, 1920, under the laws of that State, with a capitalization of $100,000, to conduct a business as importer of and dealer in chemicals, oils and colors, specializing in rubber compounding ingredients. Stocks of standardized materials will be carried for the convenience of rubber manufacturers in the West and Mid-West. The officers are: Robert I. Wishnick, president and treasurer; Julius Tumpeer, vice-president; David Tumpeer, secretary. The company will be able to handle carload shipments on its own private switch and make freight shipments direct from its terminal through the tunnel system.

Reichel & Drews, formerly at 559 West Lake street, Chicago, Illinois, manufacturers of fabric-cutting machinery, have removed to their new factory at 452-456 North Ashland avenue, Chicago.

Thomas E. Wilson & Co., Chicago, Illinois, sporting goods manufacturer, has taken over the Chicago Sporting Goods Manufacturing Co. Fred J. Ratsch, formerly the head of the latter concern, will be director of the jobbers' division of the Wilson company. The large new factory Mr. Ratsch was building at Powell and Charleston streets, included in the transaction, will give the Wilson company 100,000 additional square feet of manufacturing space.

O. E. Truesdell has been appointed district manufacturers' representative for the Firestone Steel Products Co., Akron, with headquarters in Indianapolis. He will take over portions of the territory heretofore handled by L. W. Enos and A. B. Droeger from Chicago and Detroit, respectively.

The Double Fabric Tire Co., Auburn, Indiana, maker of Auburn tires and tubes, attaches a tag stating the percentage of pure Pará rubber used in each Aubnrn certified tire.

The International India Rubber Corporation, South Bend, Indiana, has appointed F. A. Rendon manager of its export department. He was formerly with the Pirelli Company, Italy, and the Lee Rubber & Tire Corporation, New York City.

The Quality Tire & Rubber Co., Anderson, Indiana, recently absorbed by The Long-Wear Tire & Rubber Co., has reduced its capital stock from $4,700,000 to $4,150,000 common, and $500,000 second preferred has been created.

The Fort Wayne Tire & Rubber Manufacturing Co., Fort Wayne, Indiana, has increased its capital from $1,000,000 to $2,500,000. J. C. Brown is president of the company.

THE RUBBER TRADE ON THE PACIFIC COAST.

By Our Regular Correspondent.

LOS ANGELES NOTES.

THE PACIFIC COAST DÉBUT of the rubber bathing suit, the rubber beach cloak, and the rubber bathing hat was made but a fortnight ago in Los Angeles. That these newest styles struck popular fancy was evidenced by the admiring comments made among the forty thousand people who viewed these novel costumes at the Venice beach parade held on May 16.

Some 300 attractive girls, many of them noted screen stars from the nearby Hollywood film studios, were the primary attraction. They were garbed in every conceivable kind of modish garments suitable for actual and near-bathing; and while most of the cloth creations worn were undeniably pleasing to the eye and some of them strikingly artistic, the rubber novelties made a distinct hit. The general verdict was that they would have been equally appreciated even though they were not displayed by rather pretty mermaids.

The United States Rubber Co., which had a short time before shown the hats, capes and suits on living models at the Hotel Alexandria, Los Angeles, to buyers from many stores, had a special rubber exhibit. The advantages of the all-rubber bathing suit are that it quickly sheds water, dries in a few moments, and, unlike the damp cloth garments, can be carried about comfortably. There is a promising field for rubber bathing apparel on the Pacific Coast, as the mild climate permits bathing practically the year around on its numerous fine beaches.

The West American Rubber Co., 400-432 North Avenue 19, Los Angeles, announces the appointment of C. Lamb as superintendent. Mr. Lamb was formerly connected with the Cincinnati Rubber Manufacturing Co., Cincinnati, Ohio.

Another big tire factory may soon be established in Los Angeles to serve the West Coast trade. Preston E. Roberts, president and general manager of the Perfection Tire & Rubber Co., Fort Madison, Iowa, has been in Southern California in conference with Guasti, House & Guilli, Inc., and W. L. Bartlett, distributers of Perfection tires. In order to overcome the transportation handicap between the Mid-West and the Coast, and to expedite distribution, Mr. Roberts feels that a factory here is indispensible.

The Goodyear Tire & Rubber Co. recently broke all records of the Los Angeles Chamber of Commerce by applying for 100 memberships for members of its new factory force, and bringing the roster of the local trade board up to the 6,200 mark.

The Goodyear company has, through its subsidiary, the Southwest Cotton Co., acquired the 7,000-acre Marienette ranch of R. P. Davie to add to its 25,000-acre holdings of prime cotton-growing land in Arizona. The price of the 7,000 acres is put at $1,000,000. Pima cotton grown here has brought as high as $1.25 a pound on a $19,000 purchase. A dollar a pound is guaranteed to growers on the next crop.

Work has been started at El Segundo, a beach town close to Los Angeles, on a $2,000,000 plant for the General Chemical Co., New York City.

Practically all the leading tire makers and jobbers of Los Angeles are members of the recently reorganized Automobile Tire Manufacturers' and Jobbers' Association, of which Frank R. Price, of Nelson & Price, is president. The association will

strive to correct abuses in the tire trade, establish selling standards, and promote the interests of its members in every reasonable way.

Ernest E. Gagnon, of the Seal-It Company of New York, has been perfecting plans here for a factory to make the company's puncture cure compound. The Los Angeles factory will be the company's third, it already having two in the East.

The Fordtire & Rubber Co., Fort Worth, Texas, is planning to build a factory in Los Angeles. The company specializes on a puncture-proof process for tires, now licensed to repair men. E. A. Boyle, 517 East Ninth street, is California state manager.

The Los Angeles Pacific Navigation Line, a new company, announces that it will put on a line of vessels, running directly between Los Angeles and Singapore and the Far East. One main object is to supply the rubber factories which are being built in and near Los Angeles. It has established branch offices at Manila, Kobe, Hongkong and Shanghai, also.

George T. Bell, head of the Bell Rubber Co., started in the tire business in his native city, St. Louis, ten years ago, and moved a few years later to Akron, Ohio, where his plant now covers a city block and its output is over 100 solid tires a day. He is also head of the Tire Construction Co., West Pico and Olive streets, Los Angeles, with fine tire salesrooms, and is reputed to do the largest tire repair business on the Coast, employing forty vulcanizers.

One of the first men in the trade to develop rubber specialities on a large and varied scale for the motion picture industry in the Southwest is Douglas R. Radford, president of the West American Rubber Company, Los Angeles.

DOUGLAS R. RADFORD.

Born in London, England, in 1883, he studied engineering and qualified at the age of twenty for the position of assistant engineer of a tea plantation in Burma, India, but just as he was about to leave for the Far East the company changed its plans and left him without an engagement. He then decided to go West and take up ranching in California, but after a few months there he was called home on account of family illness and spent another year in London. The lure of the West, however, was too strong for him to resist, and he returned to Los Angeles in 1907. After working for three years at "everything from Secret Service to bridge-building," he accepted the task of putting the West American Rubber Company on its feet. In this work he has been ably aided by the secretary, C. R. Prentiss, also an engineer, and the concern has made gratifying progress. Recently the company strengthened its working force, installed more machinery, and is making plans for a large addition to the plant.

The company has been making rubber supplies for oil wells and various patented novelties, but is also branching out into other lines.

The rush of big rubber men to secure cotton acreage and cotton itself is over until next fall. All of the large tire interests have been in evidence here this year. The Seiverlings, the Fisk company, the United States Rubber Co., the Firestone company, The Miller Rubber Co., and others have been and gone and the long staple crop is presumably buttoned up.

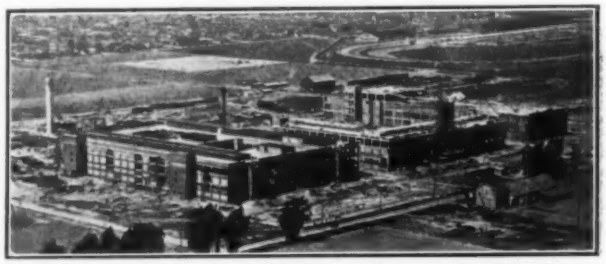
J. B. Magee, manager of the United States Rubber Company's branches in southern California and Arizona, is accounted one of the most energetic trade developers in the Southwest. He made his début in the rubber business eight years ago, when he became a statistical clerk in the office of the United States Rubber Company in San Francisco. His executive ability was soon recognized and he was repeatedly promoted, and finally put in charge of the Phoenix branch. On January 1, 1916, he was appointed to his present position, and at once began to organize an efficient sales force. That he made capable selections and infused into his lieutenants much of his own enthusiasm and fidelity is amply attested by the steady and considerable growth of the company's business in the territory allotted to him. To his aides Mr. Magee generously gives the major share of the credit for his success. His main office is at 923 South Los Angeles street, Los Angeles, and the line includes everything manufactured by the big concern he represents.

J. B. MAGEE.

F. F. Schaffer, president of Goodyear's India Rubber Glove Manufacturing Co., and Arthur Reeve, assistant general manager, footwear division of the United States Rubber Co., have just visited the Pacific Coast, including Los Angeles, San Diego, and San Francisco, as well as the Grand Cañon.

GOODYEAR'S CALIFORNIA PLANT NEARING COMPLETION.

This illustration is from a photograph, taken from an airplane, of the buildings and grounds of the Goodyear Tire & Rubber Company of California, at Ascot Park, Los Angeles, as they are now, a year after ground was broken. A bit of Los Angeles shows in the background. The picture may be compared with that of the projected plant in THE INDIA RUBBER WORLD, August 1, 1919.



AEROVIEW OF GOODYEAR PLANT, LOS ANGELES, CALIFORNIA.

SAN FRANCISCO NOTES.

At the World Metric Standardization Conference at the Palace Hotel the delegates to the Seventh National Foreign Trade Convention, just before departing, heard with much interest an address by Burgess Darrow, of the technical division of The Goodyear Tire & Rubber Co. of Akron, Ohio, on the reasons why his company has decided to adopt the metric measurements exclusively in not only marking sizes on tires, but also in calculation, construction, and in operation throughout the parent plant and the new branch concern being started in Los Angeles.

Tire makers have been invited to enter tests of non-skid products at the annual convention of the National Traffic Officers' Convention to be held here in August. A committee of members of the Advertising Clubs of America will act as judges with traffic officers from many cities in the Union. The streets in front of the Auditorium, where the convention will be held, will be made as wet as possible and the cars competing must be able

to stop quickly according to rigorous rules. A severe test will also be made of brake linings.

Frazar & Company, New York City, crude rubber importers and exporters, have opened an office in the First National Bank Building, San Francisco, to provide further facilities for Pacific Coast exports and imports. They already have an office in the New York Building, Seattle, Washington.

The Pacific Mail Steamship line runs two steamers regularly between San Francisco and Calcutta, via Singapore, and seven steamers handed over by the United States Shipping Board are conveying cargo between Shangai and Calcutta and acting as feeders for the trans-Pacific lines. Two American companies, the Robert Dollar and the Independent steamship companies, which have maintained a freight service in the East for some time, are adding to the shipping facilities between Singapore and the United States.

The Coast Tire and Rubber Company, 408-409 Syndicate building, Oakland, California, has secured a six-acre site in that city, where it will establish its new tire plant. The main building will be 72 by 360 feet, and the other buildings will include steam plant, machine shop and offices. The company was incorporated August 29, 1919, and the officers are: Holmes Ives, president; John I. Pankratz, vice-president; N. B. Campbell, treasurer, and W. D. Forbes, secretary. In addition to the above, the directors include Harold Giesse, Roy Thorpe, N. J. Whelan, A. L. Warmington and Francis H. Woodward. E. Lawthorn, formerly factory superintendent for the Federal Rubber Co., Cudahy, Wisconsin, and for the Gillette Rubber Co., Eau Claire, Wisconsin, is factory superintendent.

H. W. McKevitt, head of the McKevitt Auto Supply Co., has been appointed retail distributer of Lee tires in San Francisco.

SAN DIEGO NOTES.

H. S. Firestone, president of the Firestone Tire & Rubber Co., with his sons, Leonard and Raymond, and Barney Oldfield, were guests of friends in San Diego recently. Mr. Firestone has been making an automobile tour of Imperial Valley, and has been urging the farmers there to raise more long-staple cotton, for which there is a great demand among tire manufacturers. The Firestone concern is a heavy buyer of raw cotton and has several gins in the valley.

Credit for making the first pneumatic tire west of Chicago is claimed by the Savage Tire Co., which produced a perfect casing in 1912 at its factory in San Diego, and since that time the business has grown extensively on the Pacific Coast. John D. Spreckels, the sugar magnate, is said to hold controlling interest in the concern, which, since the first of February, has become known as The Spreckels "Savage" Tire Co., having purchased the assets of the Savage Tire Co. and the Savage Tire Corporation, both of San Diego. Plans are being made for a large extension to the plant which will give it a 100 per cent increase in production. The company will soon start to build a steel and concrete storehouse with a capacity for 70,000 tires. It will be seventy-five by six hundred and sixty feet with ten doors at which to load and unload freight cars. A three-day spring meeting of West and Southwest branch managers was held last month at the plant.

NORTHWESTERN NOTES.

Fred S. Wilson, vice-president and Pacific Coast representative of the Thermoid Rubber Co., Trenton, New Jersey, has been in Portland looking over trade conditions with the Allen & Hebard Co., local distributer of Thermoid tires.

The Oregon agency for Overman solid cushion tires in Portland has been taken by the Howell-Swift Tire Company, which handles Canton cord and Blackstone tires in this section.

E. B. Conlee, western representative of the Stanwood Rubber Co., Elizabeth, New Jersey, has been busy during the past few weeks establishing agencies for Stanwood tires in Spokane, Seattle, Portland, San Francisco, Fresno and Los Angeles.

Clyde S. Thompson, advertising manager for the Portage Tire & Rubber Co., Akron, Ohio, is studying trade conditions on the Coast.

A recent estimate puts the number of motor trucks in use in the seven states west of the Rocky Mountains as 110,000, California leading with 58,700.

SOUTHWESTERN NOTES.

A hangar for the dirigible balloon of the Goodyear Tire & Rubber Co., known as the pony blimp, is being erected at Litchfield, Arizona, where plantations of the Southwest Cotton Company, a subsidiary of the Goodyear concern, are located. The blimp will be used by the Goodyear company in messenger service between the cotton fields in Arizona and the new Goodyear factory in Los Angeles, with an intermediate stop at Blythe, California. It is 95 feet long, carries two persons, and is capable of a speed of 40 miles an hour for ten hours.

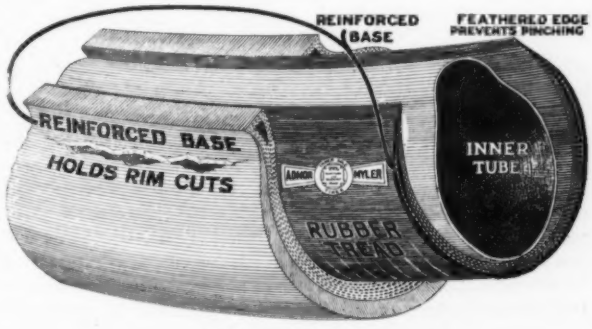
A new and larger supply station for the distribution of Miller tires in San Diego and Imperial counties has been established at Fourth and B streets, San Diego. F. C. Millhoff, general sales manager of the Miller company, has been a recent visitor in Southern California.

The Imperial Valley Cotton Growers' Association of California, which from 120,000 acres supplies cotton for tire fabrics, has petitioned the Federal Government for the admission of 2,000 Mexican laborers to handle the 1920 crop, on account of the great scarcity of American labor. At the end of the season the aliens would be sent back over the border line. Imperial Valley bankers will finance the plan.

Wayne Murray and George S. Danaher, doing business as Murray & Danaher, have become the agents for the Swinehart tires in the Southwest, covering the states of Texas, Oklahoma, New Mexico, Louisiana, and Arkansas. Both were in the government motor service during the war and have had long experience in the automobile business. Their office is at 506 Trust building, Dallas, Texas.

THE AD-MOR-MYLER INNER TUBE.

This is a special inner sole tire which, it is claimed, overcomes all the drawbacks of many such tire-saving devices now on the market. This supplemental tire is designed to save inner tubes from punctures, and can be transferred when the casing is worn out to a new one. A double rubber bead is used to strengthen the tire, take the strain off the rim edge, and, it is said, makes rim blow-outs almost impossible. The edge is feathered to prevent pinching in the casing. This inner sole tire is produced by the Ad-Mor-Myler Rubber Company, a recently incorporated Delaware corporation; capitalized for $1,000,000. Its president and founder is A. Jacquins. Henry Josephs is sales manager. To



A NOVEL INNER TIRE.

meet the growing demand the company will soon erect a six-story factory, 150 by 160 feet, at Sixth and Alameda streets, Los Angeles.

The Rubber Trade in Great Britain.

By Our Regular Correspondent.

THE TWO TOPICS about which one hears most at the time of writing are the favorable position of the raw rubber market—that is, for the manufacturers—and the budget with its increase of the excess profits duty from 40 to 60 per cent and the limited company profits tax of one shilling on the pound. This latter tax will no doubt be the eventual permanent form of the temporary excess profits duty, and its present imposition is in order to get at the undivided profit put to reserve and afterwards distributed in the form of bonus shares. It cannot be denied that our manufacturers generally are doing much better than was expected, owing to the dearth of goods in many countries, but they complain that the new taxes will have a most injurious effect upon trade, as the large profits are required to provide the extra working capital needed on account of the increased prices being paid for practically everything. Perhaps this statement should be taken with the proverbial grain of salt, but to my mind the real trouble lies in the not too distant future when European production of goods approaches the pre-war standard and we have to meet serious competition with our high wages bill and reduced output due to shorter hours of work.

The present dullness in the rubber share market must be attributed to the price of the commodity rather than to the new excess profits duty, for although the newer companies are hard hit by this tax, it is confidently expected that in 1922 demand will overtake supply, with financial results that will more than make up for any temporary setback in dividends. On this point we must wait with all the patience we can command to see if the prediction comes true.

WOMEN IN RUBBER MILLS.

In further reference to some remarks in the April issue of THE INDIA RUBBER WORLD on the increased employment of women in rubber factories, the position here, speaking generally, is that the women taken on to replace men who were called up for service in the war have been displaced by the latter on their return. In those cases where the men have unfortunately not returned or have preferred to take up some other occupation, the women have remained at their new work where this has been satisfactorily performed. Thus one can still see women engaged at mixing rolls, spreading machines, etc., work in which they did not participate before the war, and this in the smaller concerns where the nurse, the rest room and hot coffee have not yet made their appearance.

The cotton mill boom appears to have almost spent itself, and the trade is now threatened with a general strike of the operatives for a larger share in its emoluments. There is hope that the matter may be amicably settled, but the price of fabric is going to continue a source of anxiety to those in the rubber trade who use it extensively.

CELLULOSE IN RUBBER.

The authors of the analytical method for determining the amount of cellulose in rubber goods have rightly drawn attention to the fact that a wide search for various substances is essential if the determination of rubber by difference is to be taken as accurate. Except in such cases as fiber boot soles and one or two other instances where the cellulose is present in fairly large amount as a normal constituent, it seems unlikely that the somewhat tedious method worked out will be a matter of common application. When referring to experimental or analytical work on reclaimed rubber the latter ought to be fully described, as its variations are so great. In rubber reclaimed by the mechanical method, no doubt the little cellulose left would be in the form of the original cotton, while in an alkali reclaim it would be there, if at all, as oxy-cellulose, and it may be that the acetylation method will not prove satisfactory in the latter case. It is doubtful whether the cellulose determination as an index to the presence or absence of reclaimed rubber in a mixing will be found as reliable as the other indirect methods which have preceded it.

THE RESEARCH ASSOCIATION OF BRITISH RUBBER AND TIRE MANUFACTURERS.

The appointment of D. B. Porritt, chief chemist of the North British Rubber Co., Limited, to the post of director of research has been received by the trade generally with approbation, and with particular satisfaction by his personal acquaintances. He combines academic distinction with that practical knowledge which can be acquired only by many years of close association with manufacturing, and the field in which such associated qualifications are to be met with is by no means a large one. This does not imply that the task of the selection committee was devoid of all difficulty, but it is clear to outsiders intimately acquainted with the trade that if there were hundreds of applicants for the advertised post it would be a very simple matter to reduce them to a round dozen.

It is rumored that the work, which at first will be on somewhat modest lines, will take place in London, though the actual spot has not yet been announced—perhaps it has not yet been decided upon. The main activities of the Research Association, it is understood, will be concerned essentially with fundamental problems rather than with works difficulties and this is as it should be, seeing that half the money is put up by the taxpayers who, it appears, are not to be favored with details of the discoveries made or work carried out. Speaking of research associations generally which are now in progress of formation for various industries and not specially of what may happen in the association under notice, calls to mind the position of affairs which led to complaints against the National Physical Laboratory a year or two after its foundation when a good deal of routine work ordinarily undertaken by professional analysts was being done. The interesting announcement is made that the committee in control of the work intends, if it seems desirable, to secure the services of independent rubber chemists to assist in special work.

THE PROOFING TRADE.

It is a sign of the progress that America has made during the war period that the present demands of Canada are being so largely met from the States instead of from Great Britain, as was formerly the case. This defection is not a matter of great concern at the moment because proofers have plenty of work on their hands, but all the same, efforts will doubtless be put forth to regain the lost trade. Other countries, which in normal times would be doing more proofing on their own, are held up by a shortage of cloth, a point which is all in favor of our export trade. It rained steadily all April, which encouraged the mackintosh as against the mere raincoat, an article which appears to be losing some of its former popularity. It seems to have come home to many purchasers that this latter is a nice looking comfortable sort of garment for fine weather or for wet weather if you have an umbrella with you.

It comes somewhat as a shock to hear that Vickers, Limited, the armament firm of Sheffield, is going into the waterproof garment trade at its Dartford Works. It is common knowledge that the firm controls the cable works of W. T. Glover & Co., Limited, of Manchester, but it is not widely known that it is the proprietor of the Ioco Proofing Co., Limited, of Anniesland, Glasgow, where a large amount of airship material was proofed

during the war. The firm is also understood to be interested in bakelite synthetic resin manufacture.

The Monarch Rubber Co., Limited, of Bradford Road, Manchester, proofers to the trade, are engaged in fitting up more extensive new premises at Miles Platting, a mile or so away, and the Monarch Waterproof Co., Limited, which does the making-up side of the business, will also be moving shortly from its present address in Cheetham, Manchester, to more commodious premises in Lower Broughton Lane, Manchester.

To commemorate its Silver Jubilee the waterproofing firm of Ferguson, Shiers & Co., Limited, has issued an illustrated souvenir giving details of the work and machinery.

Rubber proofing is carried on at Phoenix Mills, Failsworth, Manchester, and rainproofing at Blossom Mills, Strangeways, Manchester. Interest attaches mainly to the large new mill erected at the Failsworth Works during the war, which for certain reasons was taken over on completion by a new company, in which Messrs. Frankenburg were largely interested, to do a certain class of work for the Government. As the armistice was signed shortly after the formation of the company, this work was never entered upon and the new mill has now reverted to Ferguson, Shiers & Co., Limited. The building, which is well planned with lofty work rooms, contains 15 mixing machines and 36 spreading machines and embodies all the latest conveniences for dealing with large quantities of single and double-texture proofing in a hygienic manner, the ventilation system having been designed to meet the latest requirements of the Dangerous Trades Department of the Home Office. This firm is quite distinct from that of A. O. Ferguson & Co., Limited, which is located a mile or two away and which was founded some years ago by the son of G. E. Ferguson, the late senior partner of Ferguson, Shiers & Co., Limited.

Worries incidental to labor, mainly with regard to remuneration, are a somewhat warm theme, but of late a new sort of labor worry has made itself felt. This is concerned with the action taken by men's unions in cases where individuals are inclined to grumble about their accouterments. To take a concrete case, the railway companies fit out their servants with mackintoshes, usually blue or black shades for station masters and porters, and stout drill khaki ones for those engaged in rough work, like shunters. Whereas ten years ago complaints were practically unknown, some workman, who may possibly have misused his garment, makes a fuss about its inferiority and his union takes the matter up and starts correspondence with the officials, who pass the complaint on to the manufacturers.

RUBBER SPONGES.

The recent Drapery and Textile Exhibition, held in London in April, was not remarkable for its rubber exhibits, though a word or two may be said about the sponge display of the Sorbo Rubber Sponge Products, Limited. This business, which is carried on in London to work a process of G. Leeson, late of Manchester, has met with considerable success in the sale of its yellow natural-color sponges, which are not damaged by soap. The business having outgrown the dimensions of the London works, a new factory is being fitted up in the more countrified surroundings of Woking, where a considerable number of hands will be engaged. A development of interest is the use of the sponge compound for toys and balls to take the place of inflated rubber articles and of celluloid goods. It is also to be used for truss pads and for other purposes such as flooring where resiliency is a desideratum. Such uses of sponge rubber seem to indicate a development of considerable significance to the rubber trade. Anyway, we have passed the initial stage of sponge making with which many of our rubber firms were wrestling not so many years ago.

BRITISH NOTES.

Edwin Swann, who was for fourteen years representative of the Anchor Chemical Co., Limited, has recently joined Alfred Smith, Limited, chemical manufacturers of Manchester, England.

An exhibition of specimens showing the diseases to which rubber trees are subject was recently held at the Imperial College of Science and Technology in South Kensington, London. It was arranged by Professor J. B. Farmer, director of the biological laboratories of the college, the specimens being sent chiefly from Ceylon and Malaya. The exhibits are diagrams; actual trunks of *Hevea*, showing how tapping works; specimens of rubber trees showing the diseases to which they are subject, and cultures which have been transferred by inoculation since their arrival in England, from the tainted stumps to other plants.

ANOTHER TEST OF RUBBER PAVEMENT IN LONDON.

The new stretch of rubber road pavement in Southwark, London, which was mentioned in THE INDIA RUBBER WORLD last July, has been laid in a busy thoroughfare where it will be severely tested. It covers 400 square yards on one side of Borough High Street, between St. George's Church and the Elephant and Castle, and a great part of the South London traffic must pass over it.

The blocks are 9 by 3 inches and ⅝ of an inch thick; ½-inch of gray rubber is placed on a layer of vulcanite held closely to a steel plate with circular perforations into which the vulcanite has been set to secure a firm hold. The steel plate is cut

RUBBER PAVING IN BOROUGH HIGH STREET, SOUTHWARK.

in four places and the strips cut are turned down to form lugs which are imbedded in a concrete foundation. The blocks rest on this granolithic concrete which is 3½ inches thick.

This pavement was manufactured by the Leyland & Birmingham Rubber Co., Limited, and is looked upon as a great improvement on those that were experimented with before the war, such as that in the Old Kent Road. This road surface is claimed to be sanitary, noiseless, and non-skidding, all of which has been proved to the satisfaction of careful observers.

FOREIGN NOTES.

AT MANRESA, near Barcelona, Spain, an automobile tire factory has been established, which expects to make fifty tires a day, enough to satisfy the present demand. The main part of the factory is used to produce *alpargatas*, cheap canvas shoes such as the poorer Spaniards use, but with rubber soles. These will outlast by far the usual hemp soles and can be made at a smaller cost.

Automobile tires are in great demand in Sweden at present. Competition is keen with American tires predominating. There

is a considerable market for high-priced tires. The Swedish prefer hand-made tires. The increased sale of motor cars in recent months causes the demand for accessories and spare parts to exceed the supply. In 1916 the imports of tires from Great Britain amounted to $151,500, from France to $106,680 and from the United States to $34,690.

NORWEGIAN TIRE DIMENSION REGULATION.

A new regulation proposed in Norway, relating to the dimensions of tires for use on trucks in that country, provides for the use of pneumatic tires on trucks smaller than 2-ton capacity, such as 1½- and 1-ton capacity, particularly for use on country roads. It is also proposed that the tread of tires used on country roads shall be not less than five inches. This legislation is being put forward in the attempt to prevent the spoiling of the roads which, otherwise, is looked for within two years.

A BIT OF HISTORY.

On the back of an interesting trade catalog of the year 1830, reproduced in facsimile by the Antwerp *"Bulletin des Planteurs de Caoutchouc,"* and which antedates not only the Belgian possession of African territory but the establishment of the present Kingdom of Belgium, are printed the conditions of an impending rubber sale: 6,407 pairs of shoes of gum elastic which came by the good ship *Matilda* are to be sold, as well as 161 pairs that arrived previously by the ship *Diana*. They are of three standard sizes and are packed in barrels and the brokers who handle them are firms, some of which are still in the rubber business, namely, Grisar & Co., Oldenhoven, de May, Chantrain and Ch. Franck & Co. The sale was limited to bona fide residents of Antwerp.

THE RUBBER TRADE IN JAPAN.

By Our Regular Correspondent.

THE LATEST OFFICIAL STATISTICS indicate that imports of crude rubber into Japan amounted in 1919 to 24,132,838 pounds valued at $8,682,098, an increase of 7,771,936 pounds and $2,207,979 over the 1918 imports. The rate of the increase is 48 per cent in quantity and 34 per cent in value, showing that the rubber manufacturing industry in Japan is continuing the remarkable progress made during the war. This is chiefly attributable to the increase of investors in the industry. Notwithstanding the increase in Japanese rubber goods exports, the manufacture of automobile and bicycle tires, rubber cloths and mechanicals, also industrial rubber goods for home demands, was materially increased.

IMPORTS OF CRUDE RUBBER INTO JAPAN.

	1918.		1919.	
From:	Pounds.	Value.	Pounds.	Value.
British India	526,168	$234,207	507,147	$206,306
Straits Settlements	15,248,181	5,938,066	22,782,949	7,936,457
Dutch East Indies	274,716	73,775	95,593	21,841
Great Britain	148,652	126,281	545,885	357,803
United States	94,465	81,160	173,368	151,629
Other countries	68,720	20,630	27,896	8,062
Totals	16,360,902	$6,474,119	24,132,838	$8,682,098

IMPORTS OF RUBBER MANUFACTURES INTO JAPAN.

	1918.		1919.	
	Pounds.	Value.	Pounds.	Value.
Unvulcanized	47,290	$9,656	155,429	$29,062
Dental rubber	23,284	54,097	33,497	85,053
Soft rubber—				
Rods and cords	149,865	106,858	145,176	95,545
Plates, sheets and tubes	344,252	144,709	384,684	166,524
Threads, strips, bands, rings and washers	108,886	102,651	78,617	123,743
Other soft goods	172,394	98,473	162,800	94,034
Other rubber goods	33,677	31,074	71,681	63,869
Waste or old rubber	.....	86,254	.....	273,053
Bicycle tires	424	560	1,820	3,105
Insulated wire—				
Submarine cables	.....	3,325	206,584	35,707
Other armored cables	10,005	3,821	131,956	72,920
Other wires	58,717	35,108	900,862	89,042
Waterproof sheeting	8,669	6,764	396,862	164,619
Elastic webbing	.....	79,798	25,006	26,759
Insulating tape	24,566	11,923	.....	138,559
Woven belts and hose	231,029	198,842	250,430	234,425
Totals	.....	$973,913	.....	$1,696,019

In addition to the above imports of rubber goods, automobiles and parts (including tires) were imported to the value of $5,641,150 in 1919 against $3,830,906 in 1918; and bicycle tires and parts to the value of $1,289,775 in 1919 against $750,364 in 1918.

In 1912 rubber goods imports reached their highest mark, but as the Japanese rubber manufacturing industry developed, foreign goods imports gradually decreased. Automobile and bicycle tires are now well made in Japan and supply most of the demand. In 1919 automobiles were imported largely and are in large demand for business purposes, but not as a luxury.

EXPORTS OF RUBBER MANUFACTURES FROM JAPAN.

	1918.		1919.	
	Pounds.	Value.	Pounds.	Value.
Rubber toys and balloons	.....	$383,270	.....	$671,883
Rubber tires	3,261,324	2,253,469	4,808,244	3,557,018
Insulated wires	12,742,382	4,162,167	12,501,023	4,205,850
Other rubber manufactures	.....	612,600	.....	1,255,171
Totals	.....	$7,411,506	.....	$9,689,922

There were also exported 2,609 jinrikishas, valued at $110,085 in 1919 against of 2,651 valued at $71,133 in 1918, and 5,660 bicycles and parts (exclusive rubber tires) valued at 1,690,911 in 1919, against 7,408 valued at $2,161,334 in 1918.

The total values amounted to $2,156,091 in 1915; $2,934,940 in 1916; $4,002,592 in 1917; $7,411,506 in 1918, and $11,490,918 in 1919. Jinrikishas for China, Hongkong, Straits Settlements and British India showed a gradual decrease, for they were exported as parts, not as completed vehicles. But the works have been erected in these districts to supply the parts and, on the other hand, the competition between jinrikishas and automobiles is beginning to be felt.

Owing to the interruption of trade during the war, Japanese rubber goods exports are increasing year after year, for the Japanese rubber industry is capable of supplying the lack of European and American goods in China, Manchuria, Malaya, British India, South Indies and Australia. Even now, after the restoration of peace, the Japanese rubber industry is still holding its gains during the war period.

NOTES FROM JAPAN.

Japanese rubber manufacturers have received enormous orders from Siberia. The Mitado, Toyo, Nippon and Meije factories have formed a combination to compete against the Dunlop establishment at Kobe.

In preparation for the expansion of automobile traffic, Japanese business men are about to form the Oriental Road Construction Co., with a capital of 10,000,000 yen. (One yen equals $0.498.) Besides the bad roads, the weak bridges are a hindrance to motor traffic, and to the hoped for development of Japan's motor industry.

In 1918, Japan imported 6,454,696 pounds of crude rubber and gutta percha, of which 5,920,521 pounds came from the Straits Settlements.

THE RUBBER AND COTTON TRADE OF THE NETHERLANDS.

THE RUBBER TRADE of the Netherlands was virtually at a complete standstill during the year 1918. There were no imports or exports of rubber, and only a very small quantity of the stock on hand was delivered to manufacturers. During the first half of the year trade between the Dutch East Indies and the United States was insignificant. When business later picked up and prices increased, the European situation and American import restrictions brought the trade to a sudden end. Very little business was done between the Netherlands and her colonies.

For the two periods from March to August, 1918, and from September, 1918, to February, 1919, the distribution of crude

rubber by the Netherlands Overseas Trust to manufacturers was effected at the base price of $1.18 per pound for prime *Hevea*, plus interest and warehouse charges from March 1, 1918. A lower price for the poorer qualities was fixed only after lengthy negotiations. The total quantity distributed was 464 tons. Manufacturers could use no more because of the lack of necessary compounding ingredients. Stocks in mid-July were estimated to be sufficient to last six months with a very restricted factory production.

The amounts of capital invested in Dutch rubber companies in recent years are of interest and were as follows: 1913, $908,520; 1914, $276,375; 1915, none; 1916, $522,600; 1917, $2,003,970; 1918, $779,880.

Rubber goods manufacture seems likely to be stimulated by the newly established cotton exchange of the Rotterdam Cotton Association, which promises to become a formidable competitor of the Bremen exchange. Although the textile industry of the Netherlands has been an important one, Dutch spinners before the war covered their requirements principally in Bremen and to a limited extent in Liverpool. Becoming dissatisfied with the practices of the Bremen merchants in 1915, the new Rotterdam cotton exchange was the result. Several large firms have engaged in the business; leading dock companies have constructed big modern cotton warehouses along the Meuse; the principal steamship companies will operate direct lines to Galveston and New Orleans at rates not above those to Bremen, and a guaranty fund has been pledged by Dutch merchants and spinners to defray the heavy initial expenses of the exchange. The Rotterdam rules have been established on the basis of Washington and Liverpool standards, but on the whole they correspond with the Bremen rules, as Continental buyers and American shippers are fully accustomed to them.

Rotterdam enjoys excellent shipping facilities essential to the success of this project. Much cheaper freight rates are obtainable on the rivers Rhine and Meuse to Belgium, the west and south of Germany, Alsace, Switzerland, and even to Austria and Italy, than those by rail from Bremen. Rotterdam also owns several regular direct steamship lines to Denmark, Norway, Sweden, Russia and the Baltic ports of Germany, so that in these countries the new exchange may compete favorably with Bremen.

A PLANTATION RUBBER KNIFE.

There is a variety of tapping tools in use at the present time on rubber plantations and all possess practical merit under certain conditions. The tool here illustrated is a type that includes simplicity in construction, adjustment, manner of use and in sharpening.

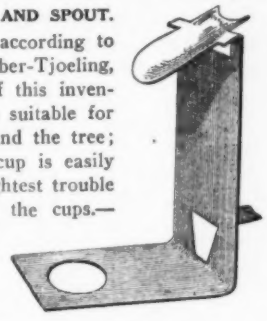
It is a modified farrier's knife with a strong tool-steel blade and provided with a "fool proof" adjustable gage for regulating the depth of the cut. The curve of the cutting edge is

ELECTRO TAPPING TOOL.

designed for the purpose of effective cutting and paring, and when necessary the renewal of the edge by sharpening in the usual manner. The handle consists of two hardwood sections, that are riveted to the shank of the blade. (Thomas Newey & Sons, Limited, Birmingham, England.)

COMBINED LATEX CUP SUPPORT AND SPOUT.

This spout-cup bearer is made according to the idea of J. H. Recoert, Soember-Tjoeling, Dampit, Java. The advantages of this invention over all others are that it is suitable for any kind of cup; it does not wound the tree; no hard rubber, less scrap; the cup is easily seen; the tappers have not the slightest trouble with removing and putting back the cups.—(Netherland Indies Metal Ware & Packing Co., Malang, Java.)



SPOUT-CUP BEARER.

THE DELFT RUBBER INSTITUTE.

The Netherland Government Institute for Advising the Rubber Trade and the Rubber Industry was established at Delft some years ago, under the patronage of the International Association for the Cultivation of Rubber in the Netherlands Indies, through the exertions of Professor G. van Iterson. In 1912 the first report and notes of the Institute appeared. A second instalment of notes appeared in 1916, making a volume of 500 pages, abstracts of which were published in English in 1917.

The object of the Institute is to place crude rubber commercial transactions on a scientific basis; to advise producers how crude rubber should be prepared; and to inform the trade how various crude rubbers should be treated.

The Batavia Exposition in 1914, enabled it to analyze samples and to compare the results of its investigation with those reached by the rubber brokers. Since then it has directed its attention to simplifying and shortening the examinations. Similar laboratories have been established in Java, at Kuala Lumpur in the Federated Malay States, and at the Imperial Institute, in London.

NOTES FROM THE FAR EAST.

THE MEDAN COMMERCIAL ASSOCIATION states that the total area planted with rubber in the Sumatra East Coast district, including the Atchin east coast, at the end of June, 1919, was 133,543 hectares, of which 71,415 hectares were producing rubber. The whole area, despite unfavorable circumstances, has increased by 10 per cent.

The Ceylon Department of Agriculture has appointed an inspector with three sub-inspectors under him to watch the rubber plantations on the island for diseases and insect pests. They are to suggest measures for fighting these when discovered, and to urge the planters to join the official campaign of cure and prevention.

From Padang in Sumatra, 284,800 pounds of gutta percha were exported in the first six months of 1919, against 85,891 pounds in the same period of 1918.

The Dutch East Indies in the quarter ended September 30, 1919, exported to the United States 5,515,840 pounds of rubber valued at $2,165,015; 38,334 pounds of jelutong, valued at $3,624, and 4,145 pounds of gutta percha, valued at $1,051.

Calcutta has started a bus service employing 200 vehicles equipped with tires specially constructed to meet the difficulties of Calcutta roads.

India imported rubber tires in the four months from April to August, 1919, to the value of 3,560,000 rupees; of these the United States supplied 1,145,000 rupees worth and Japan 9,000 rupees worth. One rupee equals $0.32 United States currency.

Burma's largest ten rubber plantations produced 1,142,383 pounds of rubber in the first six months of 1919. The exports of rubber in those months amounted to 2,206,527 pounds valued at $836,052, compared with 1,340,074 pounds, valued at $808,831, exported in the first six months of 1918.

In Burma the Government has decided to advance 100 rupees at 6½ per cent. interest for every acre that is planted with rubber, with the hope of restoring the importance of the industry.

While the chief commercial product of the Fiji Islands is sugar and something is done in copra, the British administrators expect that the new rubber industry will become one of the most important. There are 225 islands in the group, 80 of which are inhabited, the largest being Viti Levu, on which is Suva, the capital and chief port. While there is steamer communication with Australia, New Zealand and Canada and the trade with the United States is by schooners, anxiety is expressed about American competition in Fiji, and still more is felt about Japanese enterprise.

Rubber conditions in Indo-China were in a bad state in the last half of 1918, owing chiefly to the French Government's prohibiting the exportation of rubber to any country but France, which coincided in point of time with the impossibilty of securing freight steamers and the very unfavorable course of exchange. Besides this the carelessness and inexperience of many planters sent rubber to the market that was irregular in quality, and especially in appearance. The result was a crisis which piled up 25,000,000 francs worth of rubber in storage and came near making many plantations give up work. A few orders amounting to about 1,200 tons, secured by the efforts of M. Garnier of the Marseilles Colonial Institute, have saved the situation to a certain extent. The planters have decided to organize their industry better and to establish a laboratory at Saigon.

Exports from Sumatra East Coast in 1919 exceeded by far those of previous years, as is shown by the figures compiled by the Medan Chamber of Commerce:

Exports.		1918.	1919.
Hevea	*kilos*	19,445,447	38,185,935
Ficus elastica		361,840	182,136

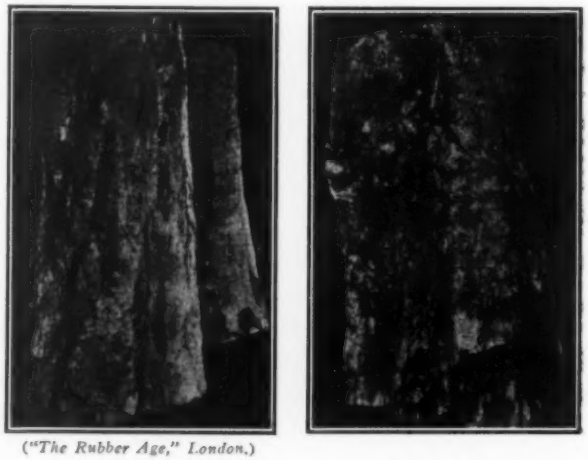
The *Hevea* rubber exports were 96 per cent more than in 1918. The increase is due to increased production, that for 1919 being over 36,000 tons, while the 1918 production was abnormally small, owing to the intentional restrictions. The stock on hand was 4,000 tons at the beginning and 1,000 tons at the end of 1919.

The Incorporated Society of Planters at Kuala Lampur in the Federated Malay States, formed in October, 1919, has 237 members, and at the January meeting elected officers, as follows: Chairman, A. B. Milne, Ipoh; vice-chairman, H. Nixon, Malacca; secretary, C. Ward-Jackson. It is the first association of planters to be formed in Malaya, though there is a similar organization in Southern India. The object of the association is not commercial, but to promote the mutual welfare and to bring the planters and the companies that employ them into greater harmony of purpose.

RUBBER TREE DISEASES.

When the number of diseases and enemies to which rubber trees are subject are considered, the casual observer is inclined to wonder how rubber trees manage to survive at all. It is something like the study of a medical treatise by which the reader can easily persuade himself that he has symptoms of almost every known complaint. Fortunately, however, as in the latter case, all diseases do not attack every tree or every plantation at once. To-day brown bast easily takes first place among the enemies of rubber plantations. So far as the general public is concerned, this is practically a new disease. In point of fact, however, it has been known for many years, but only recently has attention been drawn to it to any considerable extent. In the old days when plantations were closely planted, it was a simple matter to eliminate altogether trees effected with this fatal disease. With the wider planting now generally practiced every tree counts for a tree, and, as every rubber shareholder knows, the question has recently assumed considerable prominence.

The first sign of brown bast is a big increase in the latex yield of the tree affected, but this soon diminishes and ultimately ceases altogether. The bark discolors and hard burrs appear, and if the disease is neglected the tree becomes useless. The disease is very prevalent throughout the East, few estates having less than 5 per cent and some as high as 60 per cent of their trees affected. Curative methods such as resting, liming and manuring have been tried without success and the only remedy known so far is that



("*The Rubber Age*," London.)

ADVANCED STAGE. FINAL STAGE.

BROWN BAST.

of stripping the bark from the portions attacked, afterwards shading the cambium until a new growth of bark has developed. It is obvious that a disease of this kind is likely to exert a powerful influence on overproduction and should no remedial measures be found its increase at the worst might involve wholesale replanting of trees in from 15 to 20 years' time.

Up to quite recently brown bast was described as a physiological disease of the tree, the term in reality being only a confession of ignorance as to its true nature. It was supposed to be due to the effects of tapping and has been compared with anemia in a human being. Recently, however, a mycologist in Sumatra claims to have isolated a definite bacterium to which the disease is due, and should further research support this discovery, the search for a remedy would appear to be not so hopeless once the cause is known.

Among other diseases with which estates are troubled may be placed in order after brown bast, the well-known *Fomes, Ustulina*, pink dieback, striped canker, and a new enemy called patch canker, while it is well known that any diseased wood is liable to attacks from white ants. Apart from brown bast, however, which has so far defeated the best efforts, most of these diseases are well understood and can be adequately treated if taken in time.

ELCH GUM IN KURDISTAN.

In the part of Kurdistan which is now in British hands, at the head waters of the Tigris, a gum, resembling the lower grades of gutta, is obtained from a tree which the Arabs call Buttom and the Kurds, Gkraswam. The gum is called elk (elch) in Arabic and is obtained by tapping the tree, just as rubber trees are tapped. The tree produces also fruit which is used for food and is pressed for the oil it contains. The elch gum is transported to Aleppo and also to Bagdad; it is used for sizing cloth and as chewing gum, and also as medicine and in making arrack liquor from dates. The trees grow only in the valleys and attain a height of 50 feet and a girth of 8 feet.

Recent Patents Relating to Rubber.

THE UNITED STATES.

ISSUED APRIL 13, 1920.

No. 1,336,452. Solid tire. H. K. Wheelock, Long Beach, Calif.
1,336,527. Door buffer of sheet rubber. S. G. Lewis, Greensburg, and G. W. Daum, Jeannette—both in Pennsylvania.
1,336,531. Demountable rim for tires. J. C. Manternach, assignor by mesne assignments to The Standard Parts Co.—both of Cleveland, O.
1,336,572. Fountain pen. C. A. Luck, assignor to The Conklin Pen Manufacturing Co.—both of Toledo, O. (Original application divided.)
1,336,601. Dirigible balloon. R. H. Upson, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.
1,336,663. Pneumatic tire. E. M. Story, Braintree, Mass.
1,336,746. Rubber-dam clamp appliance. J. W. Ivory, Philadelphia, Pa.
1,336,962. Rubber sandal. F. A. Joseph, assignor to L. Candee & Co.—both of New Haven, Conn.
1,337,178. Receptacle for pneumatic tire tubes. M. F. Swerer, Jamestown, Calif.

ISSUED APRIL 20, 1920.

1,337,211. Milking machine teat cup. J. G. G. Eklundh, C. Oden, and J. A. Schmidt, assignors to The Universal Milking Machine Co.—all of Columbus, O.
1,337,225. Artificial respirator. C. L. Heald, Cedar Rapids, Iowa.
1,337,288. Fuel hose for gas fixtures. C. Stichler, assignor to Strause Gas Co.—both of Philadelphia, Pa.
1,337,289. Resilient tire. J. G. Summers, San Diego, Calif.
1,337,316. Pneumatic tire valve. J. O. Hellwell, Pasadena, Calif.
1,337,443. Resilient reinforced non-skid tire. D. J. Demas, Pittsburgh, Pa.
1,337,446. Demountable sectional rim for tires. M. A. and L. M. Endres, Cross Plains, Wis.
1,337,528. Spring plate tire filler. J. H. North, Blackwood, N. J.
1,337,606. Dust cap for tire valves. A. L. Just, Syracuse, N. Y.
1,337,660. Pneumatic tire. E. B. Killen, London, England.
1,337,813. Pneumatic tire. E. P. Altenburg, Columbiana, O.
1,337,962. Rubber and fiber composition heel-plate for shoes. Hugh G. Robinson, Philadelphia, Pa.

ISSUED APRIL 27, 1920.

1,338,011. Armored pneumatic tire. B. Granville, New York City.
1,338,054. Dust cap for tire valve stems. W. E. Vollmer, Sandusky, O.
1,338,072. Demountable rim for tires. R. R. Craft, Norfolk, Nebr.
1,338,110. Demountable rim for tires. B. A. Stocking, Boone, Iowa.
1,338,145. Demountable rim for tires. A. E. McPherson, assignor to J. Rosenthal—both of Beaumont, Tex.
1,338,184. Combination rubber stamp and pen rack. L. B. Lindquist, Maida, N. D.
1,338,245. Tire valve. E. V. Myers, East Orange, N. J., assignor to A. Schrader's Son, Inc., Brooklyn, N. Y.
1,338,390. Demountable rim for tires. O. W. Mott, Jackson, Mich., assignor to Perlman Rim Corp., New York City.
1,338,464. Douche tip. M. M. Shafer, Los Angeles, Calif.
1,338,578. Surgical tourniquet. R. Maeda, Seattle, Wash.
1,338,584. Cushion horseshoe. H. Paar, Canton, assignor of one-third to C. McGranahan, Youngstown—both in Ohio.
1,338,595. Pneumatic tire with supplementary tire within inner tube. W. J. Stoltz, St. Louis, Mo.
1,338,629. Fountain-pen. C. E. Hood, Memphis, Tenn.

ISSUED MAY 4, 1920.

1,338,677. Demountable and fixed rims for tires in combination. T. E. Cook and A. T. Freije, Rincon, N. Mex.
1,338,710. Douche nozzle. E. V. Szyperski, Detroit, Mich.
1,338,817. Cushion heel. P. A. De Luca, New York City.
1,338,858. Lady's garter. M. de Los S. Enriquez, New York City.
1,338,905. Anaesthetic apparatus. A. C. Clark, assignor to A. C. Clark & Co.—both of Chicago, Ill.
1,338,986. Rubber and metal hoof protector for horses. W. J. Kent, Brooklyn, N. Y., assignor to The Mechanical Rubber Co., a New Jersey corporation.
1,339,216. Windshield cleaner. L. H. Morse and J. J. Tracy, Cleveland, Ohio; said Morse assignor to said Tracy.
1,339,241. Duplex windshield cleaner. H. C. Trip, Auburn, N. Y.
1,339,283. Sectional inner tube for tires. J. A. Perkins, Brooklyn, N. Y.

THE DOMINION OF CANADA.

ISSUED APRIL 6, 1920.

198,900. Pneumatic seat cushions. G. L. Chase, Seattle, Washington, U. S. A.
198,930. Cushion heel with protecting plate. H. Glover, South Acton, Mass., U. S. A.
199,093. Sectional tire with removable blocks of rubber, etc., to facilitate replacement and also provide for insertion of alternative projecting studs for use on soft ground. E. Feuillette, Boulogne sur Seine, France.

ISSUED APRIL 13, 1920.

199,105. Tire package. E. H. Angier, Framingham, Mass., U. S. A.
199,116. Electric repair pad vulcanized for pneumatic tires. D. E. Booth, Tulsa, Okla., U. S. A.
199,119. Dust cap and sleeve for inflating tubes. E. O. Collins, Chillicothe, Ohio, U. S. A.
199,144. Dust cap for tire valves. A. L. Just, Syracuse, N. Y., U. S. A.
199,147. Dust cap for tire valves. H. P. Kraft, Ridgewood, N. J., U. S. A.
199,148. Tire valve. H. P. Kraft, Ridgewood, N. J., U. S. A.
199,149. Inflating coupling. H. P. Kraft, Ridgewood, N. J., U. S. A.
199,159. Tire valve cap. W. P. McComb, Conroe, Tex., U. S. A.
199,165. Blow-off valve for tire inflation tubes. E. W. Phillips, Delta, O., U. S. A.
199,204. Blow-off and hose connection for tires. The Automatic Safety Tire Valve Corp., New York City, assignee of S. Kahn, Newark, N. J.—both in U. S. A.
199,222. Dust cap for tire valves. A Schrader's Son, Inc., New York City, assignee of F. Nielson, Dorchester, Mass.—both in U. S. A.

ISSUED APRIL 20, 1920.

199,261. Demountable rim for tires. N. L. Baker, Minneapolis, Minn., U. S. A.
199,262. Demountable rim for tires. N. L. Baker, Minneapolis, Minn., U. S. A.
199,298. Armored pneumatic tire of rubber and fabric. G. R. Granzow, Thompson, Iowa, U. S. A.
199,306. Pneumatic tire. P. L. Hedges, Charleston, Ill., U. S. A.
199,326. Vaginal douche. T. H. Larson, Oshkosh, Wis., U. S. A.
199,329. Removable resilient pad for crutches, artificial limbs, etc. F. C. Lynde, Manchester, England.
199,348. Pneumatic tire. H. Nicholson, Chicago, Ill., U. S. A.
199,426. Demountable rim for tires. W. H. Fox and B. W. Japs, assignee of one-half interest—both of Minneapolis, Minn., U. S. A.
199,441. Pneumatic tire. J. A. Johnson, Indianapolis, Ind., U. S. A.

ISSUED APRIL 27, 1920.

199,482. Gum and mint case. L. W. Buchenau, Stockton, Calif., U. S. A.
199,499. Cushion tire. F. Ditchfield, Montreal, Quebec, Canada.
199,520. Lumberman's rubber balmoral having water-tight tongue vulcanized in one with body. C. L. Grant, Grande Pre, Nova Scotia, Canada.
199,527. Pneumatic tire having layers of sponge rubber disposed between outer casing and inner casing, and inner casing and inner tube, the layers being vulcanized to inner casing to form a homogeneous structure. L. Hofmeister, Milwaukee, Wis., U. S. A.
199,573. Rubber heel cushion formed in two parts made integral, one being more resilient than the other. J. Pietzuch, Cincinnati, O., U. S. A.
199,663. Shower bathing apparatus of perforated tubing, etc. The Simplex Shower Bath Co., assignee of H. W. Patrick—both of Mansfield, O., U. S. A.

THE UNITED KINGDOM.

ISSUED APRIL 8, 1920.

138,393. Pneumatic tire with reinforced tread. J. F. F. W. Ure, 13 Trinity Gardens, Folkestone, Kent.
138,399. Revoluble rubber heel. A. E. and F. J. Lancaster, 212 Bristol Road, Edgbaston, Birmingham.
138,520. Rubber corn shield. W. R. Edwards, 15 Earl street, Maidstone, Kent.
138,553. Pneumatic tire. W. C. Whalley and J. A. Andrews, 4 Marldon avenue, Great Crosby, Liverpool.

ISSUED APRIL 14, 1920.

138,630. Pipe couplings. Titeflex Metal Hose Corp., Badger avenue, Newark, assignee of W. H. Fulton, Irvington—both in New Jersey, U. S. A. (Not yet accepted.)
138,631. Gas masks. M. Meyer, 4 Nymphenburgerstrasse, Schonberg, Berlin. (Not yet accepted.)
138,638. Gas masks. M. Meyer, 4 Nymphenburgerstrasse, Schonberg, Berlin. Addition to No. 138,631. (Not yet accepted.)
138,694. Combined pressure gage and relief valve for tires. W. E. Beasley, Rose Cottage, Cheddington, Buckinghamshire.
138,717. Demountable rim for tires. W. Ormsby, 20 Sneinten Boulevard, Nottingham.
138,779. Demountable rim for tires. J. Knight, 9 Caldy Road, Aintree, Liverpool.
138,781. Solid tire. G. Jackson, The Cedars, Albert Road, Wolverhampton, and W. W. Hickman, Beech Tree House, Wall Heath, near Dudley—both in Staffordshire.
138,789. Fountain pen. A. A. Peace, 30 Loreburn Road, Wavertree, Liverpool.
138,794. Soles and heels for boots, having air cells and insertions of vulcanized asbestos composition to prevent slipping. M. T. M. Byrne, 333 St. John street, and G. H. Long, 122 Upper street, Islington—both in London.

ISSUED APRIL 21, 1920.

139,076. Pneumatic tire valve. A. C. Wright and Warne, Wright & Rowland, Keeley street, Watery Lane, Birmingham.
139,117. Device for closing the neck of a toy balloon after inflation. W. F. Ingram, 165 Parnell Road, Old Ford, London.
139,206. Marking pens and brushes. C. A. Garvey, Clayton, Mo., U. S. A. (Not yet accepted.)
139,331. Foot-pad for motorcycle pedals. A. J. Stevens & Co. and A. J. Stevens, Graiseley House, Penn Road, Wolverhampton.
139,356. Dust cap for tire valves. G. B. Ellis, 70 Chancery Lane, London. (A. Schrader's Son, 783 Atlantic avenue, Brooklyn, N. Y., U. S. A.)
139,374. Motorist's cap with elastic lining. M. and N. Doniger, trading as Empire Cap Works, Derby street, Cheetham, Manchester.
139,450. Resilient wheel with pneumatic tire and tread band formed of strips of hard rubber alternating with strips of softer rubber, both resting on a band of hard rubber, etc. A. A. A. Darche, Edith Cavell Road, Alger, Algeria. (Not yet accepted.)
139,471. Elastic bust supporter. D. Kops, 525 West End avenue, New York City, U. S. A. (Not yet accepted.)
139,500. Spring wheel with pneumatic tube. M. T. Weston, 200 Fifth avenue, New York City, U. S. A. (Not yet accepted.)
139,562. Cord fabric for covering pneumatic tires. C. L. Marshall, 27 Queen Victoria street, London.
139,624. Tobacco pouch with rubber-lined pocket. W. J. Beeby, 8 Eversley Road, Small Heath, Birmingham.

Chemical Patents will be found on page 583. Machinery Patents on page 587.

THE FRENCH REPUBLIC.

PATENTS ISSUED, WITH DATES OF APPLICATION.

500,438. (October 26, 1918.) Soling of rubber, combined with any substance that reduces its elasticity. Société Française de Cuir Armé.

500,650. (June 12, 1919.) Rubber-covered cord. S. G. Lewis.

500,830. (June 19, 1919.) Improvements in pneumatic tires. A. P. R. Porte.

500,688. (June 14, 1919.) Shoes with vamp made of waste wrappings of pneumatic tires and other rubber articles. Société Kuistgaard Gummifabrik.

500,877. (June 20, 1919.) Inflating valve for pneumatic tires. Etablissement L. Rosengart.

501,060. (June 25, 1919.) Valve for pneumatic tire. T. A. Low.

501,089. (June 26, 1919.) Improvements in pneumatic tires. F. W. Lanchester.

501,341. (June 10, 1919.) Improvements in revoluble rubber and other kinds of heels. A. Cleret, avenue Alphand 19, Saint-Mandé.

501,525. (July 7, 1919.) Valve for pneumatic tires. T. A. Low.

501,535. (July 5, 1919.) Improvements in elastic tires. G. Negri.

501,753. (July 18, 1919.) Perfected resilient tire. C. C. Crump.

502,104. (July 30, 1919.) Safety device for pneumatic wheels. O. Englebert & Cie.

GERMANY.

PATENTS ISSUED, WITH DATES OF APPLICATION.

321,276. (September 12, 1915.) Pneumatic tire. A. A. Pancera, Genoa, Italy.

321,359. (January 18, 1912.) Pneumatic tire. E. B. Killen, London.

321,439. (July 20, 1913.) Belting. A. Jonas and G. Getting, St. Denis, France.

321,753. (March 18, 1919.) Packing ring. G. Bunge, Kücknitz, near Lüxbeck.

321,890. (January 15, 1919.) Bandage. H. Garoli, Lahr, Baden.

TRADE MARKS.

THE UNITED STATES.

NO. 113,134. The words BEADED TIP—rubber heels. United Lace & Braid Manufacturing Co., Cranston, R. I. (See THE INDIA RUBBER WORLD, August 1, 1919, page 638.)

116,015. The words DURACORD HARD SERVICE CABLE above a horizontal line—electric portable cables protected by rubber—impregnated woven insulation. Tubular Woven Fabric Co., Pawtucket, R. I. (See THE INDIA RUBBER WORLD, February 1, 1920, page 299.)

117,024. The words DURA-SET—insulated-wire conductors. Tubular Woven Fabric Co., Pawtucket, R. I.

117,403. The words GOLIATH and THE GENERAL RUBBER GOODS CO., CLEVELAND, OHIO, contained within a diamond—belting, hose and packing. The General Rubber Goods Co., Cleveland, O.

117,655. Representation of a leaf and flowers of lily-of-the-valley and the word LILY on a scroll around the stems—elastic webs. Faire Bros. & Co., Limited, Leicester, Eng.

117,787. The words VULCA PATCH within a rectangle separated by the representation of a tire and underneath the tire the words THE PATCH THAT SEALS—self-vulcanizing tire patch. Vulca Laboratories, San Francisco, Calif.

117,658. Representation of a pansy above the word PANSY—elastic webs. Faire Bros. & Co., Limited, Leicester, Eng.

119,348. Representation of a Liberty cap bearing three stars on the head-band, above a horizontal line over the word LIBCO, all within the conventionalized outline of a shield—rubber tires. Liberty Steel Products Co., Inc., New York City.

119,707. The stencilled letters I BECO—rubber belting, hose, packing, etc. Imperial Belting Co., Chicago, Ill.

120,778. The word USCO—floor covering now made of rubber compound. United States Rubber Co., New Brunswick, N. J., and New York City.

121,440. The words BOONE TIRES separated by a picture of the pioneer Daniel Boone, inclosed within a circle above a scroll—rubber and canvas tire casings. Boone Tire & Rubber Co., Chippewa Falls, Wis.

121,896. The word REXALL in stencilled letters—elevator, conveyor, or transmission belting of rubber, etc. Imperial Belting Company, Chicago, Ill.

122,997. The words RUB-TEX—fibrous rubber mats for floors, automobiles, running boards, etc. Rub-Tex Organization Co., Kenton, O.

123,366. A red seal beneath the words RED SEAL—inner-tube repair outfits. Red Seal Rubber Manufacturing Co., Oklahoma, Okla.

124,015. The words FLINT-ROCK within a white diamond superimposed on a black disk, all inclosed by a white circle—rubber-soled shoes made of fabric and rubber. Sears, Roebuck & Co., Chicago, Ill.

124,915. The word OUTLOOK—wind-shield cleaners of the squilgee type. (See THE INDIA RUBBER WORLD, April 1, 1918, page 413.)

125,155. The letter X above the letter J, with a horizontal line between—leather shoes with rubber soles and heels. Jureidini Export Co., New York City.

125,162. The word NORWALK superimposed on a panel picture of a fleet of yachts against a background of sea and clouds, the panel being in turn superimposed on a tire with the words FLOATING STOCK between the panel and the lower part of the tire—rubber tires. The Norwalk Tire & Rubber Co., Inc., Norwalk, Conn.

125,261. The initials and words "W. L. TEDFORD'S SUPER SERVICE PATCH, KEEP A KAN IN YOUR KAR," the initials and word "W. L. Tedford's" being a facsimile of the applicant's signature—tires, tubes, and casing-patch. W. L. Tedford, Little Rock, Ark.

125,964. The words BLACK BEAUTY—rubber water-bags and rubber bottles. The Miller Rubber Co., Akron, O. (See THE INDIA RUBBER WORLD, March 1, 1918, page 353.)

126,022. The words "ONE-SET," the hyphen being formed by an extension of the cross-piece of the first "E"—printing-press inking rollers. The B. F. Goodrich Co., New York City.

126,154. Representation of a black-outlined rectangle bisected vertically by a single heavy line extending above and below—brake linings. Thermoid Rubber Co., Hamilton Township, Mercer County, N. J.

126,213. The word RELCO within an oval beneath the word RELIABLE, and at the right and left, respectively, of the oval, the words REG. U. S. PAT. OFFICE and NEW YORK, U. S. A.—fountain pens. Abraham Harris, New York City.

126,436. The word GRIZZLYBEAR—a duplex crinkled or creped paper for wrapping tires, etc. Angier Mechanical Laboratories, Framingham, Mass.

126,572. The words MOR-ECON—elevator belts made of rubber reinforced with fabric. The B. F. Goodrich Co., New York City.

126,606. The word JOLIET above representation of head of Joliet—jar rubbers. Walker-Matteson Co., Joliet, Ill.

126,586. The word ALLROAD—rubber or rubber and fabric tires and tubes. McClaren Rubber Co., Charlotte, N. C.

126,793. Representation of an Indian arrow-head in silhouette pointing to the right—rubber boots, shoes, etc. Nathaniel Fisher & Co., New York City.

127,121. The word CLIMAX—arm-pit dress shields and diaper supporters. M. S. George, St. Louis, Mo.

127,503. The words REST-ASSURED inclosed in an oval formed by the end of the letter R—rubber boots and shoes, etc. Nathaniel Fisher & Co., New York City.

127,722. The words KENYON CORD—rubber tires and tubes. C. Kenyon Co., Brooklyn, N. Y.

127,750. The letter A within the outline of a club-spot—hard rubber battery jars, insulations, etc. American Hard Rubber Co., Hempstead and New York City, N. Y.

128,138. The word ORBITAN—combined rubber, leather, and fabric shoes and slippers. A. J. Bates & Co., Inc., New York City.

128,290. The word AMICUS—rubber boots and shoes and shoes made wholly or partly of leather. American-National Shoe & Leather Corp., New York City.

128,492. The word DEFIANCE, combined with conventionalized sprays of leaves and knot of ribbon, forming frame around the letter "G"—hard or semi-hard rubber battery jars. The B. F. Goodrich Co., New York City.

128,494. The letter "G" framed by conventionalized sprays of leaves and knot of ribbon—hard or semi-hard rubber battery jars. The B. F. Goodrich Co., New York City.

128,495. The word DEFIANCE above the letter "G" framed by conventionalized sprays of leaves and knot of ribbon—hard or semi-hard rubber battery jars. The B. F. Goodrich Co., New York City.

129,152. Representation of a section of belting having a copper thread or wire laid or woven longitudinally in it—rubber and other kinds of belting having a copper thread or wire woven or laid in them longitudinally. The Rossendale-Reddaway Belting and Hose Co., Newark, N. J.

THE DOMINION OF CANADA.

26,133. Circular device comprising the outer concentric circles and arbitrary inner circular arrangement of stripes forming a fantastic and distinctive simulation of the word KELLY, bifurcated to display the word SPRINGFIELD—pneumatic and solid tires and inner tubes. Kelly-Springfield Tire Co., New York City.

26,138. Representation of a maple leaf with the name, THE MAPLE LEAF RUBBER COMPANY, LIMITED, printed with distinctive arrangement underneath and presenting a suitable base for the leaf—Canadian Consolidated Rubber Company, Limited, Montreal, Que.

26,214. The letter "P"—rubber tires, soft rubber goods, druggists' sundries, etc. The F. E. Partridge Rubber Co., Limited, Guelph, Ont.

26,215. The word PARTRIDGE—same goods as No. 26,214. The F. E. Partridge Rubber Co., Limited, Guelph, Ont.

26,217. Representation of an inflated rubber tire with a partridge standing erect within the circle thereof and upon the inner edge of the lower portion—rubber footwear. The F. E. Partridge Rubber Co., Limited, Guelph, Ont.

26,218. The letter "N"—same goods as Nos. 26,214 and 26,215. The F. E. Partridge Rubber Co., Limited, Guelph, Ont.

26,219. The word NORTHERN—rubber tires, soft rubber goods, druggists' rubber sundries, etc. The F. E. Partridge Rubber Co., Limited, Guelph, Ont.

26,220. The letter "P"—rubber footwear. The F. E. Partridge Rubber Co., Limited, Guelph, Ont.

26,262. The word ELASTICAPS—rubber insulators for electric wire splices. The Elasticap Co., Hoboken, N. J., U. S. A. (See THE INDIA RUBBER WORLD, March 1, 1920, page 366.)

26,279. The words GEARED TO THE ROAD used in connection with the words Miller Tires—rubber tires and tubes. The Miller Rubber Co., Akron, O., U. S. A. (See THE INDIA RUBBER WORLD, March 1, 1919, page 311.

26,289. The words ACE-HI—footwear, clothing, heels and soles, vehicle and animal coverings, cloth, belting, hose, tires, insulating material, cement, druggists' sundries and plumbers' supplies, etc., made wholly or partly of rubber or treated with substances containing rubber. The Miner Rubber Co., Limited, Montreal, Que.

26,290. The word TRIUMPH—same goods as No. 26,289. The Miner Rubber Co., Limited, Montreal, Que.

26,291. The words RAIN KING—same goods as Nos. 26,289 and 26,290. The Miner Rubber Co., Limited, Montreal, Que.

26,292. The word FRONTENAC—same goods as Nos. 26,289 to 26,291, inclusive. The Miner Rubber Co., Limited, Montreal, Que.

26,293. The word KIDDIE—same goods as Nos. 26,289 to 26,292, inclusive. The Miner Rubber Co., Limited, Montreal, Que.

26,294. The word COLLEGIATE—same goods as Nos. 26,289 to 26,293, inclusive. The Miner Rubber Co., Limited, Montreal, Que.

26,295. The word VIKING—same goods as Nos. 26,289 to 26,294, inclusive. The Miner Rubber Co., Limited, Montreal, Que.

THE UNITED KINGDOM.

389,268. The word ARIEL—elastic webs and cords for use in clothing. Faire Bros. & Co., Limited, 2 Southampton street, and St. George's Mills, Leicester.

390,957. The words WILLSON GOGGLES, and upstanding from the second "I" of the word "Willson" a circle containing the letter "W" and a pair of goggles—rubber-rimmed safety goggles. T. A. Willson & Co., Inc., Second and Washington streets, Reading, Pa., U. S. A. (See THE INDIA RUBBER WORLD, page 591, this issue.)

395,075. The word LEWCOS—rubber-insulated wire. The London Electric Wire Co. and Smiths, Limited, 7 Playhouse Yard, Golden Lane, London, E. C. 1.

395,451. The word AUTOGLIDER—rubber tires. C. R. Townsend, Caxton House, Great Charles street, Birmingham.

395,701. The word "LIQUIDCUIR" in quotation marks—liquid preparations for the repair of boots, shoes, and leather articles. Henri Boisson, 20 rue du Louvre, Paris. Care of G. F. Redfern & Co., 15 South street, Finsbury, London, E. C. 2.

396,013. The words THE "OXFORD" above circular picture of a man and a girl boating, all above the words GENTLEMEN'S COMPLETE SERIES, COMPRISING ONE PAIR BRACES, ONE PAIR SUSPENDERS, ONE PAIR ARM BANDS, MADE AT LEICESTER—braces, suspenders, and arm bands. W. B. Martin & Co., 14 York street, Leicester.

396,159. The word CARMAC—clothing, except corsets, included in Class No. 38. Carmac Rubber, Limited, Huntershill Works, Bishopbriggs, Glasgow, and 6-8 Lime Street Square, London, E. C.

396,160. The word CARMAC—rubber and gutta percha goods not included in classes other than No. 40. Carmac Rubber, Limited, Huntershill Works, Bishopbriggs, Glasgow, and 6-8 Lime Street Square, London, E. C. 3.

396,629. The word FEROLEUM—all goods included in Class No. 40. The Herbert Frood Co., Limited, Sovereign Mills, Hayfield Road, Chapel-en-le-Frith, Derbyshire.

397,328. The word TRIFLEX—all goods included in Class No. 40. The Standard Tyre and Rubber Manufacturers, Limited, Parliament Mansions, Victoria street, London, S. W. 1.

397,822. The word RELAX—garters. Eisman & Co. (London), Limited, 36 Basinghall street, London, E. C. 2.

398,237. Representation of a label bearing a Brownie-type figure whose body is composed of the conventionalized letters NN, looking and pointing at a seal bearing the same letters in the form of a monogram above the words DOUBLE N BRAND—all rubber goods included in Class No. 40. Nicholsons (Newcastle-on-Tyne), Limited, St. Ann's Chemical Works, Heaton Junction, Newcastle-on-Tyne, E.

398,254. Representation of a number of gnomes carrying tires—tires and tubes. F. W. Farr, Reclaim Works, 16 Henry street, Northampton.

398,255. Representation of a statue standing on a base inscribed HERCULES, holding up two chains which in turn support a number of gnomes carrying tires—tires, tubes, etc. F. W. Farr, trading as Hercules Tyre Co., Reclaim Works, 16 Henry street, Northampton.

398,331. The word DEXO—rubber outer covers for tires and tubes. Derry and Edwards, 1 Great Eastern street, London, E. C. 2.

398,537. The word SPARTITE—asbestos packings, etc. Spartan Manufacturing Co., Limited, Broad Street House, New Broad street, London, E. C. 2.

400,762. The word SOLANTI—rubber and gutta percha goods not included in classes other than No. 40. The India-Rubber, Gutta-Percha & Telegraph Works Co., Limited, 106 Cannon street, London, E. C. 4.

400,763. The word SOLANTI—hose included in Class No. 50. The India-Rubber, Gutta-Percha & Telegraph Works Co., Limited, 106 Cannon street, London, E. C. 4.

NEW ZEALAND.

TO AMERICANS.

16,404. The word REPUBLIC—rubber tires, tubes, belting, hose, and packing, and rubber goods of all kinds in class No. 40. The Republic Rubber Corporation, Youngstown, O., U. S. A.

DESIGNS.

THE UNITED STATES.

NO. 54,900. Bathing cap. Patented April 20, 1920. Term 14 years. F. W. Dodge, assignor to The Seamless Rubber Co., Inc.—both of New Haven, Conn.

54,901. Bathing cap. Patented April 20, 1920. Term 14 years. F. W. Dodge, New Haven, Conn.

54,903. Rubber ball. R. C. Eddy, Milwaukee, Wis.

54,912. Tire. Patented April 20, 1920. Term 7 years. W. H. Grote, assignor to Ten Broeck Tyre Co.—both of Louisville, Ky.

54,919. Tire. Patented April 20, 1920. Term 14 years. G. P. Hoffman, Akron, O.

54,920. Tire. Patented April 20, 1920. Term 14 years. G. P. Hoffman, Akron, O.

54,921. Tire. Patented April 20, 1920. Term 14 years. G. P. Hoffman, Akron, O.

54,938. Rubber heel. Patented April 20, 1920. Term 14 years. O. G. Lyon, Akron, assignor to Rayon Rubber Co., Ravenna—both in Ohio.

54,955. Tire. Patented April 20, 1920. Term 14 years. P. P. Parker, assignor to Parker Tire & Rubber Co.—Indianapolis, Ind.

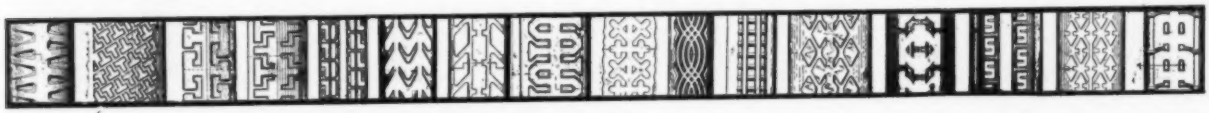
54,975. Tire tread. Patented April 20, 1920. Term 14 years. C. J. Venn, Chicago, Ill.

55,026. Tire tread. Patented May 4, 1920. Term 7 years. W. H. Clarke, Elyria, O.

55,048. Tire. Patented May 4, 1920. Term 3½ years. I. V. Humphrey, Highland Park, Pa.

55,057. Tire tread. Patented May 4, 1920. Term 3½ years. L. E. Kraft, assignor to Fort Wayne Tire & Rubber Manufacturing Co.—both of Fort Wayne, Ind.

55,059. Tire. Patented May 4, 1920. Term 14 years. G. C. Large, assignor to Wear-Well Tire Co.—both of Mahoningtown, Pa.



54,912 54,919 54,920 54,921 54,955 55,057 55,100 55,094 54,975 55,026 55,048 55,059 55,080 55,087 55,101 55,091

55,080. Tire. Patented May 4, 1920. Term 7 years. E. A. Reid, Somerset, N. J.

55,087. Tire. Patented May 4, 1920. Term 7 years. A. B. Schleicher, Pasadena, Calif.

55,091. Tire. Patented May 4, 1920. Term 14 years. F. E. Shannon, Akron, O.

55,094. Tire. Patented May 4, 1920. Term 14 years. H. J. Smith, Binghamton, N. Y.

55,100. Tire. Patented May 4, 1920. Term 3½ years. J. Tenney, Jr., Plainfield, N. J.

55,101. Tire. Patented May 4, 1920. Term 3½ years. E. H. Trump, Barberton, O.

55,104. Rubber-rimmed safety goggles. Patented May 4, 1920. Term 14 years. F. Willson, assignor to T. A. Willson & Co., Inc.—both of Reading, Pa. (See THE INDIA RUBBER WORLD, page 591 this issue.)

THE DOMINION OF CANADA.

4,759. Tire. Patented April 13, 1920. Hercules Rubber Co., Limited, Brampton, Ont.

4,760. Tire. Patented April 13, 1920. Lion Tire & Rubber Co., Limited, Toronto, Ont.

4,761. Tire. Patented April 13, 1920. M. J. Atkinson, Mimico, Ont.

4,762. Tire. Patented April 13, 1920. M. J. Atkinson, Mimico, Ont.

398,708. The word URPCO—rubber and gutta percha goods included in Class No. 4. United Rubber Products, Limited, 5 Fenchurch street, London, E. C. 3.

398,709. The word URPCO—rubber and gutta percha goods included in Class No. 11. United Rubber Products, Limited, 5 Fenchurch street, London, E. C. 3.

398,710. The word URPCO—rubber and gutta percha goods included in Class No. 38. United Rubber Products, Limited, 5 Fenchurch street, London, E. C. 3.

398,711. The word URPCO—rubber and gutta percha goods included in Class No. 39. United Rubber Products, Limited, 5 Fenchurch street, London, E. C. 3.

398,712. The word URPCO—rubber and gutta percha goods not included in classes other than Class No. 40. United Rubber Products, Limited, 5 Fenchurch street, London, E. C. 3.

398,858. A monogram composed of the letters P and B—rubber and similar belting included in Class No. 40. J. R. Crawford, 43 Robertson street, Glasgow.

398,870. The word STERANDO—all rubber goods included in Class No. 40. Anderson & Whitelaw, Limited, 11-12 Broad street corner, Birmingham, Warwickshire.

398,928. The word PHILCO—rubber and gutta percha goods not included in classes other than Class No. 40. Philadelphia Storage Battery Co., Ontario and C streets, Philadelphia, Pennsylvania, U. S. A. (Care of Johnsons & Willcox, 47 Lincoln's Inn Fields, London, W. C. 2.)

399,011. The word ASTICEL—elastic corsets. The U. K. Corset Co., 16 Goldsmith street, Nottingham.

399,711. The word DIELEX—electrical insulators, rubber-covered, etc. J. J. Eastick & Sons, 3 Belfast Road, Stoke Newington, London, N. 16.

399,783. The word RIPLACO—rubber and gutta percha goods not included in other classes than Class No. 40. The Anglo-American Commercial Corp., Limited, 34 Lombard street, London, E. C. 3.

399,895. The word ASTRA—all goods included in Class No. 40. G. E. Gardner, 231 Deansgate, Manchester.

400,165. The word EDISWAN—rubber and gutta percha goods not included in classes other than No. 40. The Edison Swan Electric Co., Limited, 123-125 Queen Victoria street, London, E. C. 4.

400,356. The word PERESCO—rubber stamps, dating stamps, etc. Pneumatic Rubber Stamp Co. (Buck's Patent), Limited, 18-19 Queenhithe, Upper Thames street, London, E. C. 4.

400,531. Representation of a bird of the parrot type perched within a tire, attacked by a number of arrows—pneumatic tires, inner tubes, and inner tube protectors. Eugene Collet, 27 avenue Crampel, Toulouse (Haute Garonne), France. Care of Cruikshank & Fairweather, 65-66 Chancery Lane, London, W. C. 2.

400,613. The word TENAX—jointings and packings included in Class No. 50. A. Oppenheimer & Co., 38 Finsbury Square, London, E. C. 2.

400,680. The word LEGLOT—sanitary appliances. The Leyland & Birmingham Rubber Co., Limited, Golden Hill Works, Leyland, Lancashire.

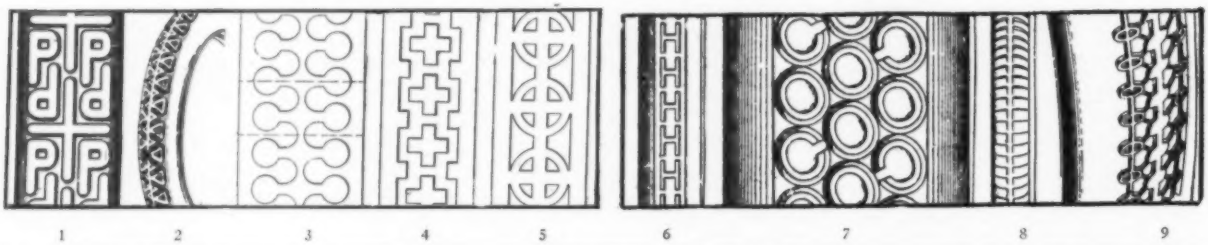
A COURSE IN INDUSTRIAL CHEMISTRY.

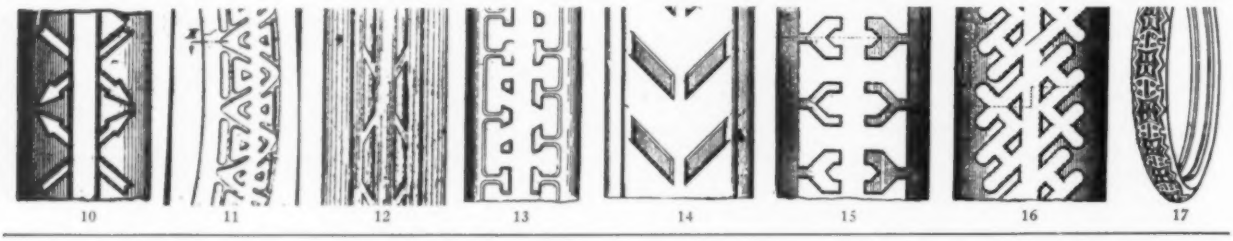
A four years' course in industrial chemistry will be started at the Cooper Union for the Advancement of Science and Art, New York City, on October 4, 1920. It will be a day course, and the intention is to make it practical as well as scientific, so that the young men and women who take it will be fully equipped as analysts, production foremen, research chemists, engineers, factory superintendents, purchasing agents, and for any pursuits that require chemical training. At the same time the proper foundation will be provided for those whose aim is original research and productive scholarship in industrial lines.

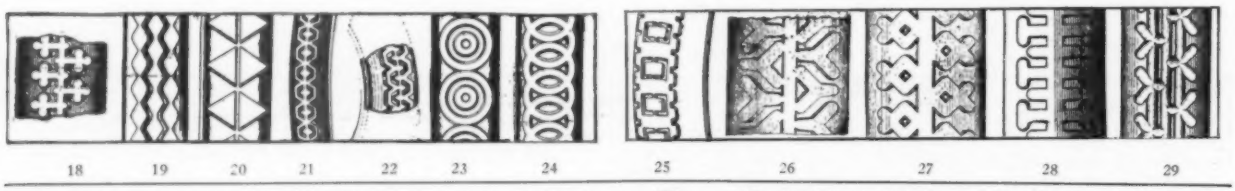
In the academic year 1920-1921 only the first year subjects will be offered. Horace G. Byers, head of the chemistry department of Cooper Union will supervise the course. He will be assisted by the staff, by such added instructors and lecturers as may be necessary, and by Dr. Maximilian Toch, recently appointed adjunct professor of applied chemistry in Cooper Union.

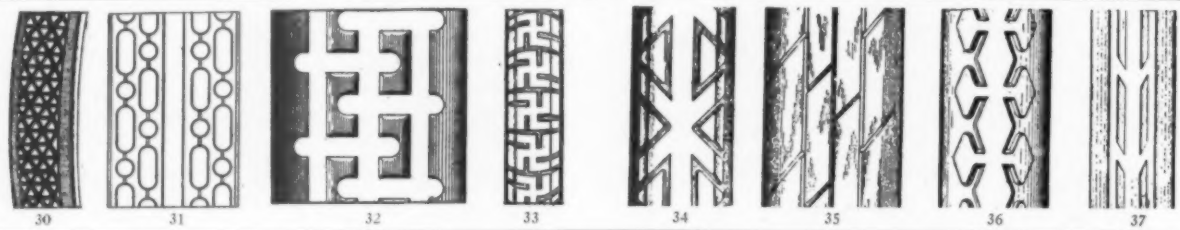
Pneumatic Tire Tread Designs.

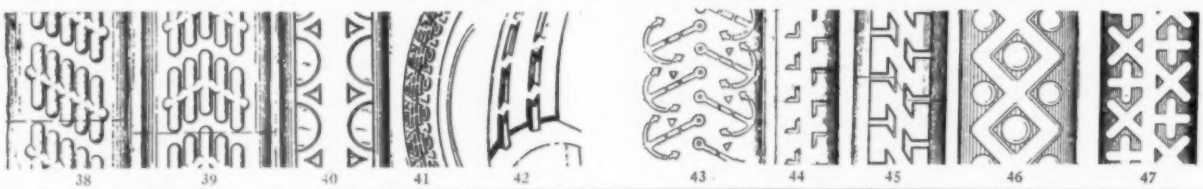
October, 1917, to August, 1918.











Cut No.	Patent No.	Patentee or Assignee and Address.
(1).	51,072.	Perfection Tire & Rubber Co., Chicago, Ill.
(2).	51,184.	The Gordon Tire & Rubber Co., Canton, Ohio.
(3).	51,193.	R. F. America, Philadelphia, Pa.
(4).	51,230.	C. A. Goetze, Minneapolis, Minn.
(5).	51,231.	C. A. Goetze, Minneapolis, Minn.
(6).	52,054.	The Dreadnaught Tire & Rubber Co., Orangeville, Md.
(7).	52,055.	F. M. Hale and F. C. McLaughlin, Kent, Ohio.
(8).	52,062.	J. B. McDevitt and M. Greenspan, Chicago, Ill.
(9).	52,067.	J. Tenney, Jr., Plainfield, N. J.
(10).	51,391.	A. L. Pearce, Philadelphia, Pa.
(11).	51,370.	A. A. Garthwaite, Conshohocken, Pa.
(12).	51,346.	G. H. Lewis, Chicopee Falls, Mass.
(13).	51,683.	The Mason Tire & Rubber Co., Kent, Ohio.
(14).	51,697.	Indiana Rubber & Insulated Wire Co., Jonesboro, Ind.
(15).	51,898.	Hewitt Rubber Co., Buffalo, N. Y.
(16).	51,899.	Hewitt Rubber Co., Buffalo, N. Y.
(17).	51,975.	W. A. Stevens, San Francisco, Calif.
(18).	51,413.	G. W. Greene, East Liverpool, Ohio.
(19).	51,418.	C. L. Landon, Akron, Ohio.
(20).	51,423.	W. H. Owens, Muskogee, Okla.
(21).	51,428.	C. L. Archer, Minneapolis, Minn.
(22).	51,429.	C. L. Archer, Minneapolis, Minn.
(23).	51,435.	W. C. Beckwith, Fostoria, Ohio.

Cut No.	Patent No.	Patentee or Assignee and Address.
(24).	51,452.	W. C. Beckwith, Fostoria, Ohio.
(25).	51,736.	Para Tire Co., New York City.
(26).	51,746.	The East Palestine Rubber Co., East Palestine, Ohio.
(27).	51,747.	The East Palestine Rubber Co., East Palestine, Ohio.
(28).	51,783.	Gryphon Rubber & Tire Corp., New York City.
(29).	51,829.	T. J. Whalen, New Castle, Penna.
(30).	51,499.	C. L. Archer, Minneapolis, Minn.
(31).	51,512.	G. F. Kreitlein, Indianapolis, Ind.
(32).	51,522.	The Akron Biltwell Tire & Rubber Co., Akron, Ohio.
(33).	51,528.	The Brunswick-Balke-Collender Co., Chicago, Ill.
(34).	51,994.	Ajax Rubber Co., New York City.
(35).	51,996.	C. A. Shriver, Toledo, Ohio.
(36).	52,026.	J. Froehlich, New York City.
(37).	52,027.	The Fisk Rubber Co., Chicopee Falls, Mass.
(38).	51,866.	The B. F. Goodrich Co., New York City.
(39).	51,867.	The B. F. Goodrich Co., New York City.
(40).	51,895.	G. S. Towne, San Francisco, Calif.
(41).	51,917.	W. Bruess, Sandusky, Ohio.
(42).	51,939.	The Goodyear Tire & Rubber Co., Akron, Ohio.
(43).	51,544.	P. D. Beck, Lawrence, Kan.
(44).	51,546.	W. B. Buckley, Overbrook, Penna.
(45).	51,555.	Michelin Tire Co., Milltown, N. J.
(46).	51,616.	Giant Tire & Rubber Co., Akron, Ohio.
(47).	51,580.	The Mutual Motor Stores Co., Cleveland, Ohio.

Review of the Crude Rubber Market.

NEW YORK.

THE LEADING FEATURES of the crude rubber market for the past month have been dullness and decline. Manufacturers have exhibited very little interest in the various market positions and have bought only in small lots. Large manufacturers have been more interested in the fabric than in the rubber situation.

Industrial operations generally have been seriously hampered by the long continued series of railroad strikes, car shortages and freight embargoes. These conditions have lessened demand as well as production in all lines and are the basic reasons for the lack of interest in crude rubber. A marked example of this is seen in the fact that transportation difficulties in the movement of raw materials and finished goods have forced rubber manufacturers in the Akron district to curtail their output practically 50 per cent by stopping work on Saturdays and discontinuing the night shift completely.

There has been some buying activity among crude rubber dealers who have been securing spot rubber to cover contracts as the market sagged off. Early in the month there was a large quantity of ribbed smoked sheets in New York, much of it shipped in from London storage.

The rubber markets in London and the Far East ruled firmer and higher than that in New York, where the impression has prevailed that large stocks of crude rubber in the hands of manufacturers and the congestion of shipping facilities will operate to send rubber prices lower. Prices for plantation and South American rubber at the beginning and toward the end of the month are shown in the following quotations:

PLANTATIONS. May 1, first latex crêpe, spot, 43¼ cents; May-June, 44 cents; July-September, 44-45 cents; July-December, 45-46 cents; October-December, 45¾ cents; January-June, 1921, 47-47¼ cents.

May 24, spot, 39 cents; May-June, 39 cents; July-September, 40 cents; October-December, 42½ cents; January-June, 1921, 44½-45 cents.

May 1, ribbed smoked sheets, spot, 43 cents; May-June, 43½ cents; July-September, 39¾-40¼ cents; July-December, 45½ cents; January-June, 1921, 47 cents; May 24, spot, 38½ cents; May-June, 38½ cents; July-September, 38¾-40¼ cents; October-December, 42¾ cents; January-June, 1921, 44¾ cents.

May 1, No. 1 amber crêpe, spot, 45 cents; May-June, 43 cents; July-December 43 cents; May 24, spot and futures, 38 cents.

May 1, No. 1 rolled brown crêpe spot, 34-35 cents; May-June, 33 cents; May 24, spot and futures, 30 cents.

SOUTH AMERICAN PARÁS AND CAUCHO. May 1, spot prices, upriver fine, 41¼ cents, islands fine, 42 cents; upriver coarse, 31 cents; islands coarse, 22 cents; Cameta coarse, 21 cents; caucho ball, 31½ cents. May 24, upriver fine, 39 cents; islands fine, 40½ cents; upriver coarse, 28½ cents; islands coarse, 21 cents; Cameta coarse, 22 cents; caucho ball, 30½ cents.

NEW YORK QUOTATIONS.

Following are the New York spot quotations, for one year ago, one month ago, and May 25, the current date:

	June 1, 1919.	May 1, 1920.	May 25, 1920.
PLANTATION HEVEA—			
First latex crêpe	$0.46 @.47	$0.42½ @.43	$0.38 @.39
Amber crêpe No. 1	.44 @	.44 @.45	.38 @.38½
Amber crêpe No. 2	.43 @	.43 @	.37 @.37½
Amber crêpe No. 3	.42 @	.42 @	.36 @.36½
Amber crêpe No. 4	.41 @	.41 @	.35 @
Brown crêpe, thick and thin clean	.41 @	.42 @	.35 @.36
Brown crêpe, thin specky	@	.39 @	.30 @

	June 1, 1919.	May 1, 1920.	May 25, 1920.
PLANTATION HEVEA—			
Brown crêpe, rolled	$0.32 @	$0.34 @	$0.30 @
Smoked sheet, ribbed, standard quality	.45 @.46	.42½ @.43	.38 @.38½
Smoked sheets, plain, standard quality	.43 @.44	.40 @	.36½ @.37½
Unsmoked sheet, standard quality	.42 @.43	@	.35 @
Colombo scrap No. 1	.32 @	.35 @	.30 @
Colombo scrap No. 2	.29 @.30	.32 @	.28 @
EAST INDIAN—			
Assam crêpe	@	@	@
Assam onions	@	@	@
Penang block scrap	.39 @	@	@
PONTIANAK—			
Banjermassin	.14 @.15	.13 @	.12 @
Palembang	@	@	.13 @
Pressed block	.16 @.17	.25 @	.25 @
Sarawak	.12 @.14	@	@
SOUTH AMERICAN—			
PARÁS—			
Upriver fine	.56½ @	.42 @	.39½ @
Upriver medium	.52 @	.39 @	.37 @
Upriver coarse	.34 @	.31 @	.30 @
Upriver weak, fine	.44 @	.36 @	.36 @
Islands, fine	.47 @	*.41½ @	.40½ @.41
Islands, medium	.43 @	*.38 @	.38 @
Islands, coarse	.21 @	.22 @	*.22 @
Cametá, coarse	.22 @	.22 @	*.22 @
Madeira, fine	@	.44 @	.43 @
Acre Bolivian, fine	@	.42½ @	.41 @
Peruvian fine	.53½ @	.40 @	.37 @
Tapajos fine	.53½ @	.40 @	.38 @
CAUCHO—			
Lower caucho ball	@	.29 @	.28 @
Upper caucho ball	.34½ @	.32½ @	.30½ @.31
MANICOBAS—			
Ceara negro heads	.36 @	*.33 @	.32 @
Ceara scrap	.32 @	*.30 @	.26 @
Manicoba, 30% guarantee	.34 @	*.30 @.33	.30 @
Mangabeira thin sheet	.38 @	.31 @	.30 @.31
CENTRALS—			
Corinto scrap	.32 @	.29 @.30	.25 @.26
Esmeralda sausage	.32 @	.29 @.30	.25 @.26
Central scrap	.31 @	@	.25 @.26
Central scrap and strip	.29 @	.27 @.28	.23 @.24
Central wet sheet	.23 @	.19 @	.18 @.19
Guayule, 20% guarantee	.28 @	.28 @	.27 @
Guayule, washed and dried	.40 @	.38 @	.37 @
AFRICANS—			
Niger flake, prime	.23 @	.18 @	.17 @
Benguela, extra No. 1, 28%	.32 @	.25 @	.18 @
Benguela, No. 2, 32½%	.30 @	.21 @	.15 @
Congo prime, black upper	*.42 @	.37 @	.36 @
Congo prime, red upper	*.40 @	.33 @	.20 @
Kassai black	@	@	.36 @
Kassai red	@	.35 @	.22 @
Rio Nunez ball	*.50 @	.36 @	.35 @
Rio Nunez sheets and strings	*.50 @	.34 @	.34 @
Conakry niggers	*.50 @	.34 @	.33 @
Massai sheets and strings	*.50 @	.34 @	.33 @
GUTTA PERCHA—			
Gutta Siak	.24 @	.30 @.31	.29 @
Red Macassar	3.15 @	2.70 @	2.60 @
BALATA—			
Block, Ciudad Bolivar	.80 @.85	.67 @.68	.70 @
Colombia	.60 @.62	.53 @.54	.50 @.52
Panama	.40 @.45	.48 @.50	.48 @
Surinam sheet	1.00 @	.84 @	.84 @
amber	1.03 @	.86 @	.86 @

*Nominal.

RECLAIMED RUBBER.

Owing to congested transportation conditions deliveries of reclaimed to the rubber manufacturers have been much curtailed during both April and May. Overdue stocks are now urgently sought and buying for future delivery has practically ceased for the time being.

Reclaimers have been forced by exhaustion of their fuel supplies to curtail operations or cease for weeks at a time. Conditions are now improving and the mills are resuming work as rapidly as possible under the circumstances.

NEW YORK QUOTATIONS.

May 25, 1920.

Prices subject to change without notice.

Standard reclaims:	
Floating	$0.30 @ $0.35
Friction	.30 @ .35
Mechanical	.12½ @ .13½
Red	.23 @ .24
Shoe	.16 @ .16½
Tires, auto	.16 @ .17
truck	.13 @ .14
White	.22 @ .25

COMPARATIVE HIGH AND LOW NEW YORK SPOT RUBBER PRICES.

	May.		
PLANTATIONS:	[1]1920.	1919.	1918.
First latex crêpe	$0.43¼ @ $0.38	$0.48 @ $0.45½	$0.68½ @ $0.63
Smoked sheet ribbed	.43¼ @ .37¾	.47 @ .44½	.68½ @ .62
PARAS:			
Upriver, fine	.41 @ .38¾	.56¼ @ .56	.68 @
Upriver, coarse	.30 @ .28½	.34¾ @ .34	.42 @ .38
Islands, fine	.40½ @ .40	.47½ @ .47	.59 @ .55½
Islands, coarse	.21 @	21½ @	.28 @ .27
Caметá	.23 @ .22	.23 @ .21½	.28 @

[1]Figured to May 25, 1920.

THE MARKET FOR COMMERCIAL PAPER.

In regard to the financial situation, Albert B. Beers, broker in crude rubber and commercial paper, No. 1 Liberty street, New York City, advises as follows:

"During May the demand for commercial paper has been rather limited, and entirely from out-of-town banks, rates on the best rubber names ruling at 7½ per cent, and those not so well known 7¾ per cent, with occasional transactions at 8 per cent."

SINGAPORE RUBBER MARKET.

GUTHRIE & CO., LIMITED, Singapore, report [April 1, 1920]:

The usual weekly auctions which opened yesterday were marked by a further decline in prices following advices of declines in the London and New York markets. Fine pale crêpe sold at up to 91½ cents (one lot realized 92 cents) or 4½ cents lower than last week while ribbed smoked sheet in selling at up to the same figure showed a decline of no less than 9 cents. Two lots sold at 92½ cents, and two lots at 92 cents. The lower grades showed reductions of from 3½ to 11 cents. The quantity catalogd was 1,235 tons, of which 767 tons were offered, but 387 tons only were sold.

The following is the course of values:

	In Singapore, per Pound.[1]	Sterling Equivalent per Pound in London.
Sheet, fine ribbed smoked	88½c @ 91½c	2/ 3½ @ 2/ 4½
Sheet, good ribbed smoked	80 @ 88	2/ 0⅜ @ 2/ 3½
Crêpe, fine pale	88 @ 91½	2/ 3⅜ @ 2/ 4⅜
Crêpe, good pale	80 @ 87½	2/ 1⅜ @ 2/ 3½
Crêpe, fine brown	76½ @ 82	2/ 0⅜ @ 2/ 1⅜
Crêpe, good brown	70 @ 76½	1/10½ @ 2/ 0⅜
Crêpe, dark	57½ @ 72	1/ 7 @ 1/11⅛
Crêpe, bark	45 @ 57	1/ 3½ @ 1/ 6⅞

[1]Quoted in Straits Settlements currency; $1 = $0.567 United States currency.

ANTWERP RUBBER MARKET.

GRISAR & CO., Antwerp, report [April 23-28, 1920]:

The market continues depressed on account of the lack of United States orders. Prices are nominal. About 35 tons of Sumatra plantation crêpe I and sheet were sold at 14.50 francs. The stock on hand today is about 674 tons.

The future market opened quiet with falling prices. Today the tone is firmer and prices quoted show a rise of from 0.05 to 0.25 francs on the lowest prices of the week. Dealings amounted to 115,000 kilograms. The price quoted today at closing was 14.10 francs.

The sale of April 28 gave very satisfactory results. Out of 448 tons offered (435 tons Congos and 13 tons Plantation) 390 tons were sold at an average advance of about 0.50 francs for Congos and 0.74 francs for plantation. There was competition for the black sorts and up to 10 francs was paid for 12 tons of black Kassai (taxed 8.90 francs), which means 1.10 francs above valuations. Prime red Congos were also in good demand and upper Congo Yakoma was sold at 8.25 francs.

The principal sales were: Black Kassai, fine quality, 9 to 10 francs; upper Congo, ordinary red, 8.75 to 9.50 francs; upper Congo, Aruwimi, 8.50 to 9.75 francs; Kassai Loanda, strips, 5.75 to 6 francs.

AMSTERDAM RUBBER MARKET.

JOOSTEN & JANSSEN, Amsterdam, report [April 30, 1920]:

During the present week business has again been slow, as the influence of the strike, only just finished, is still to be felt. Many of the lots already in port were sold at the beginning of the strike and must now be delivered; as to the parcels not yet sold, owners wish to dispose of same in the inscriptions which will be taken up again at an early date. The sudden rise in the London market had little influence, the only consequence being a strengthening of the owners' attitude to ask prices far above the market. The firmer reports from the foreign markets lead to a little turn-over on our terminal market, at slowly rising prices.

PLANTATION RUBBER EXPORTS FROM JAVA.

	February.		Two Months Ended February.	
	1919.	1920.	1919.	1920.
To Netherlands...kilos	.....	279,000	.....	598,000
Great Britain	200,000	862,000	846,000	1,010,000
United States	1,748,000	2,233,000	3,171,000	3,277,000
Singapore	393,000	349,000	931,000	740,000
Japan	40,000	29,000	67,000	29,000
Other countries	180,000	.....	217,000	.....
Totals	2,561,000	3,752,000	5,232,000	5,654,000
Ports of origin:				
Tandjong Priok	1,620,000	2,054,000	2,952,000	2,583,000
Samarang	.....	58,000	22,000	132,000
Soerabaya	819,000	1,621,000	2,030,000	2,692,000

(*Compiled by Division of Commerce and Industry, Buitenzorg, Java.*)

EXPORTS OF CRUDE RUBBER FROM BELAWAN (DELI), SUMATRA.

	February.		Two Months Ended February.	
	1919.	1920.	1919.	1920.
To Netherlands...kilos	.....	203,375	.....	452,285
Great Britain	198,172	317,497	257,744	500,443
Belgium	756,546	.....	988,260	95
United States	24,506	902,275	42,938	1,899,211
Penang	1,179,397	25,304	3,017,399	109,221
Singapore	980	313,737	980	694,873
Totals	2,159,601	1,762,188	4,307,321	3,656,128

UNITED STATES CRUDE RUBBER IMPORTS FOR 1920 (BY MONTHS).

1920.	Plantations.	Parás.	Africans.	Centrals.	Guayule.	Manicoba and Matto Grosso.	Totals, 1920.	Totals, 1919.
January *tons*	17,799	2,620	821	111	...	...	21,351	7,235
February	29,681	2,456	558	265	34	...	32,994	17,456
March	28,533	2,463	514	23	114	3	31,650	28,223
April*	21,036	1,893	628	29	79	10	23,675	28,146
Totals	97,049	9,432	2,521	428	227	13	109,670	81,050

*Also in April, balata 22 tons; miscellaneous gums 812 tons; waste 448 tons.

(*Compiled by The Rubber Association of America, Inc.*)

FEDERATED MALAY STATES RUBBER EXPORTS.

An official report from Kuala Lumpur states that the export of plantation rubber from the Federated Malay States in the month of March amounted to 9,524 tons, as against 9,781 tons in February and 10,679 tons in the corresponding month last year. The total export for the first quarter of the year is 30,424 tons, compared with 28,651 tons for the same period last year, and 22,117 tons in 1918. Appended are the comparative statistics:

	1918.	1919.	1920.
January *tons*	7,588	7,163	11,119
February	6,820	10,809	9,781
March	7,709	10,679	9,524
Totals	22,117	28,651	30,424

STRAITS SETTLEMENTS RUBBER EXPORTS.

An official report from Singapore reports that 5,931 tons of rubber were exported from Straits Settlements ports in the month of March, compared with 17,379 tons in February and 20,908 tons in the corresponding month last year. Transhipments for March amounted to 1,340 tons. For three months of the present year the exports amounted to 36,435 tons against 50,973 tons last year and 15,494 tons in 1918. Appended are the comparative statistics:

	1918.	1919.	1920.
January *tons*	4,302	14,404	13,125
February	2,334	15,661	17,379
March	8,858	20,908	5,931
Totals	15,494	50,973	36,435

CEYLON RUBBER IMPORTS AND EXPORTS.

IMPORTS.

	January 1 to March 29.	
	1919.	1920.
Crude rubber:		
From Straits Settlements...*pounds*	577,342	807,814
India	462,047	547,666
Burma and other countries	.....	6,300
Totals	1,039,389	1,363,583

EXPORTS.

Crude rubber:		
To United Kingdom	7,560,384	8,935,040
Belgium	.....	18,360
France	285,100	80,640
Germany	.....	81,348
Italy	.....	67,200
Australia	62,742	20,191
United States	23,597,234	9,191,022
Canada and Newfoundland	.....	257,600
India	1,612	.....
Straits Settlements	424	.....
Japan	105,320	13,492
Totals	31,612,816	18,664,893

(*Compiled by the Ceylon Chamber of Commerce.*)

CRUDE RUBBER ARRIVALS AT ATLANTIC AND PACIFIC PORTS AS STATED BY SHIPS' MANIFESTS.

PARAS AND CAUCHO AT NEW YORK.

	Fine.	Medium.	Coarse.	Caucho.	Totals. Pounds.
APRIL 23. By the S. S. *Hubert*, from Iquitos, Itacoatiara, Manáos and Pará.					
Paul Bertuch	.....	.....	.....	69,440	69,440
Meyer & Brown, Inc.	78,400	.....	4,480	.....	82,880
H. A. Astlett & Co.	127,300	.....	162,300	173,900	463,500
Wm. Schall & Co.	68,402	.....	2,610	.....	71,012
Hagemeyer Trading Co.	114,000	.....	.....	.....	114,000
Poel & Kelly	.....	.....	.....	.....	41,744
G. Amsinck & Co., Inc.	.....	.....	.....	.....	79,772
General Rubber Co.	.....	.....	.....	.....	71,638
Namburg & Co.	.....	.....	.....	.....	11,760
Various	.....	.....	.....	.....	280,570
APRIL 23. By the S. S. *Hubert*, in transit for Bolivia.					
Wm. Seebal & Co.	.....	.....	.....	.....	106,428
F. R. Henderson & Co.	.....	.....	.....	.....	11,270
Neuss, Hesslein & Co.	.....	.....	.....	.....	9,800
G. Amsinck & Co., Inc.	.....	.....	.....	.....	8,526
APRIL 28. By the S. S. *Byron*, from Pará.					
Meyer & Brown, Inc.	64,960	.....	.....	13,440	78,400
MAY 1. By the S. S. *Michael*, from Iquitos, Pará and Manáos.					
Paul Bertuch	.....	.....	.....	.....	160,257
Meyer & Brown, Inc.	.....	.....	.....	.....	1,960
Hagemeyer & Brunn	346,000	.....	.....	56,000	402,000
Thornett & Fehr, Inc.	.....	.....	.....	.....	13,146
Poel & Kelly	.....	.....	.....	.....	14,014
G. Amsinck & Co., Inc.	.....	.....	.....	.....	13,034
H. A. Astlett & Co.	100,300	.....	26,100	288,800	415,200
Various	.....	.....	.....	.....	280,570
MAY 1. By the S. S. *Alban*, from Manáos and Pará.					
Poel & Kelly	.....	.....	.....	.....	12,250
Raw Products Co.	.....	.....	.....	.....	784
Paul Bertuch	.....	.....	.....	.....	44,690
H. A. Astlett & Co.	112,023	.....	67,000	116,000	295,023
G. Amsinck & Co., Inc.	.....	.....	.....	.....	21,166
Gosho Co., Inc.	.....	.....	.....	.....	568
Thornett & Fehr, Inc.	.....	.....	.....	.....	21,166
Wm. Schall & Co.	10,254	.....	4,469	15,749	30,472
Neuss, Hesslein & Co.	.....	.....	.....	.....	32,144
Meyer & Brown, Inc.	.....	.....	.....	47,600	47,600
Hagemeyer & Brunn	50,000	.....	.....	43,226	93,226

PLANTATIONS.

(*Figured 180 pounds to the bale or case.*)

	Shipment from:	Shipped to:	Pounds.	Totals.
APRIL 22. By the S. S. *West Argosa*, at New York.				
L. Littlejohn & Co., Inc.	East	New York	672,000	
J. T. Johnstone & Co., Inc.	Batavia	New York	49,280	
Edward Maurer Co., Inc.	Batavia	New York	57,420	
Vernon Metal & Produce Co.	Batavia	New York	44,100	
Winter, Ross & Co.	Batavia	New York	41,220	
The Goodyear Tire & Rubber Co.	Batavia	Akron	88,920	
Various	Batavia	New York	195,840	
Poel & Kelly	Singapore	New York	302,580	
Mitsui & Co., Limited	Singapore	New York	40,320	
Heidelbach, Ickleheimer & Co.	Singapore	New York	260,100	
Meyer & Brown, Inc.	Singapore	New York	280,000	
Various	Singapore	New York	428,660	2,463,430
APRIL 22. By the S. S. *Tyndareus*, at Seattle.				
Various	Hongkong	Seattle	135,720	135,720
APRIL 23. By the S. S. *Port Borneo*, at New York.				
Thornett & Fehr, Inc.	Liverpool	New York	26,280	
The B. F. Goodrich Co.	Liverpool	Akron	39,600	
Poel & Kelly	Liverpool	New York	1,080	
Various	Liverpool	New York	355,340	420,300
APRIL 23. By the S. S. *Menominee*, at New York.				
Various	Liverpool	New York	720	720
APRIL 24. By the S. S. *Costigan*, at New York.				
Aldens' Successors, Inc.	Singapore	New York	122,400	
Fred Stern & Co.	Singapore	New York	20,520	
F. R. Henderson & Co.	Singapore	New York	74,880	
L. Littlejohn & Co., Inc.	Singapore	New York	179,200	
The B. F. Goodrich Co.	Singapore	Akron	202,320	
Meyer & Brown, Inc.	Singapore	New York	224,000	
The Fisk Rubber Co.	Batavia	Chicopee Falls	147,420	
Various	Batavia	New York	221,580	
Various	Singapore	New York	670,260	1,862,580
APRIL 29. By the S. S. St. *Paul*, at New York.				
The Goodyear Tire & Rubber Co.	London	Akron	94,320	94,320
APRIL 29. By the S. S. *Minnesota*, at New York.				
T. D. Downing & Co.	London	New York	106,020	
The B. F. Goodrich Co.	London	Akron	29,160	
Various	London	New York	398,520	533,700
APRIL 30. By the S. S. *Mesaba*, at New York.				
General Rubber Co.	London	New York	156,600	
Meyer & Brown, Inc.	London	New York	112,000	268,600
MAY 1. By the S. S. *Valdura*, at New York.				
The B. F. Goodrich Co.	London	Akron	2,520	
Poel & Kelly	London	New York	263,160	
Thornett & Fehr, Inc.	London	New York	116,100	
General Rubber Co.	London	New York	1,293,660	
T. D. Downing & Co.	London	New York	126,900	
L. Littlejohn & Co., Inc.	London	New York	2,220	
Various	London	New York	1,120,380	2,924,940
MAY 1. By the S. S. *Kansas*, at New York.				
United Overseas Co.	Colombo	New York	30,420	
J. M. Duche & Sons.	Colombo	New York	26,640	
Winter, Ross & Co.	Colombo	New York	19,800	
Chas. T. Wilson Co., Inc.	Colombo	New York	274,500	
Rogers-Pyatt Shellac Co.	Colombo	New York	26,640	
Thornett & Fehr, Inc.	Colombo	New York	68,760	
The Goodyear Tire & Rubber Co.	Colombo	Akron	90,000	
L. Littlejohn & Co., Inc.	Colombo	New York	178,020	
F. W. Frost & Co., Inc.	Colombo	New York	47,520	
United States Rubber Co.	Colombo	New York	225,000	
Firestone Tire & Rubber Co.	Colombo	Akron	49,680	
Poel & Kelly	Colombo	New York	54,180	
Various	Colombo	New York	175,320	1,266,480
MAY 2. By the *Inkula*, at Portland, Maine.				
Meyer & Brown, Inc.	London	New York	40,320	40,320
MAY 3. By the S. S. *Astyanax*, at New York.				
L. Littlejohn & Co., Inc.	Java	New York	365,120	365,120
MAY 3. By the S. S. *Aymeric*, at New York.				
L. Littlejohn & Co., Inc.	Colombo	New York	78,400	78,400
MAY 3. By the S. S. *Glenshane*, at New York.				
United States Rubber Co.	Colombo	New York	135,000	
Edward Bonstead & Co.	Singapore	New York	45,000	
Thornett & Fehr, Inc.	Singapore	New York	40,050	
Poel & Kelly	Singapore	New York	193,800	
F. R. Henderson & Co.	Singapore	New York	42,600	
General Rubber Co.	Singapore	New York	321,000	
Mitsui & Co., Limited.	Singapore	New York	84,000	
Vernon Metal & Produce Co.	Singapore	New York	16,800	
Raw Products Co.	Singapore	New York	24,000	
Rubber Importers & Dealers' Co., Inc.	Singapore	New York	50,400	
Konig Bros. & Co.	Singapore	New York	11,100	
Various	Singapore	New York	175,950	
The Goodyear Tire & Rubber Co.	Penang	Akron	72,000	
Thornett & Fehr, Inc.	Penang	New York	33,150	1,244,850
MAY 5. By the S. S. *Ariosto*, at New York.				
Poel & Kelly	Singapore	New York	259,560	
F. R. Henderson & Co.	Singapore	New York	561,600	
L. Littlejohn & Co., Inc.	Singapore	New York	403,200	
Vernon Metal & Produce Co.	Singapore	New York	49,500	
William H. Stiles & Co.	Singapore	New York	119,340	
Meyer & Brown, Inc.	Singapore	New York	100,800	
Rubber Trading Co.	Singapore	New York	50,400	
Chas. T. Wilson Co., Inc.	Singapore	New York	108,000	
Winter, Ross & Co.	Singapore	New York	19,080	
Balfour, Williamson & Co.	Singapore	New York	39,780	
United Malayaian Rubber Co., Limited	Singapore	New York	46,980	
Thornett & Fehr, Inc.	Singapore	New York	169,380	
Aldens' Successors, Inc.	Singapore	New York	41,900	
Pell & Dumont, Inc.	Singapore	New York	201,600	
General Rubber Co.	Singapore	New York	475,020	
Mitsui & Co., Limited.	Singapore	New York	32,760	
Fred Stern & Co.	Singapore	New York	72,020	
J. T. Johnstone & Co., Inc.	Singapore	New York	102,100	
Firestone Tire & Rubber Co.	Singapore	Akron	188,820	

	Shipment from:	Shipped to:	Pounds.	Totals.
Hood Rubber Co.....	Singapore	Watertown	54,000	
East Asiatic Co., Inc...	Medan	New York	4,500	
The Fisk Rubber Co....	Medan	Chicopee Falls	92,880	
The B. F. Goodrich Co..	Penang	Akron	5,580	
Aldens' Successors, Inc.	Penang	New York	39,600	
F. R. Henderson & Co..	Penang	New York	134,640	
L. Littlejohn & Co., Inc.	Penang	New York	29,700	
William H. Stiles & Co..	Penang	New York	49,500	
Mitsui & Co., Limited..	Penang	New York	27,040	
C. F. McPhillips.....	Penang	New York	28,440	
Thornett & Fehr, Inc...	Penang	New York	10,080	
Various	Singapore	New York	839,520	
Various	Medan	New York	51,120	
Various	Penang	New York	164,880	4,573,320
MAY 6. By the S. S. *Shinkoku Maru*, at New York.				
L. Sutro & Co.....	Colombo	New York	258,480	
Chas. T. Wilson Co., Inc.	Colombo	New York	38,700	
United States Rubber Co.	Colombo	New York	117,000	
U. T. Sargent & Sons..	Colombo	New York	23,040	
Poel & Kelly.....	Colombo	New York	193,860	
Firestone Tire & Rubber Co.	Colombo	Akron	9,720	
L. Littlejohn & Co., Inc.	Colombo	New York	89,600	730,400
MAY 6. By the S. S. *Seekonk*, at New York.				
L. Littlejohn & Co., Inc.	Colombo	New York	134,000	
Poel & Kelly.....	Colombo	New York	25,050	
L. Littlejohn & Co., Inc.	Colombo	New York	95,250	
Various	Colombo	New York	33,600	288,300
MAY 7. By the S. S. *Celtic*, at New York.				
General Rubber Co.....	Liverpool	New York	117,750	117,750
MAY 7. By the S. S. *Villavia*, at New York.				
Poel & Kelly.....	Liverpool	New York	25,380	
R. F. Downing & Co....	Liverpool	New York	11,880	
Various	Liverpool	New York	1,080	38,340
MAY 7. By the S. S. *Buitenzorg*, at New York.				
G. Amsinck & Co., Inc..	Penang	New York	7,740	
Various	Penang	New York	27,000	
L. Littlejohn & Co., Inc.	Java	New York	246,400	
Aldens' Successors, Inc.	Soerabaya	New York	88,200	
Various	Soerabaya	New York	219,060	
L. Littlejohn & Co., Inc.	T'jong Priok	New York	17,640	
The Goodyear Tire & Rubber Co.	T'jong Priok	Akron	54,000	
Rubber Trading Co.....	Singapore	New York	33,600	
Various	T'jong Priok	New York	1,110,060	1,803,700
MAY 10. By the S. S. *City of Hankow*, at New York.				
L. Littlejohn & Co., Inc.	Colombo	New York	152,800	
Poel & Kelly.....	Colombo	New York	157,840	
United States Rubber Co.	Colombo	New York	316,980	
Firestone Tire & Rubber Co.	Colombo	Akron	9,360	
Meyer & Brown, Inc....	Colombo	New York	22,400	
Chas. T. Wilson Co., Inc.	Colombo	New York	113,580	
Overseas Export & Import Co.	Colombo	New York	36,180	
Rubber Importers & Dealers Co., Inc.....	Colombo	New York	23,760	
Rogers-Pyatt Shellac Co.	Colombo	New York	14,400	
Thornett & Fehr, Inc...	Colombo	New York	61,920	
C. F. McPhillips.....	Colombo	New York	80,640	
The B. F. Goodrich Co..	Colombo	Akron	27,360	
The Goodyear Tire & Rubber Co.	Colombo	Akron	125,820	
E. S. Kuh & Valk Co..	Colombo	New York	25,200	
Vernon Metal & Produce Co.	Colombo	New York	46,800	
Various	Colombo	New York	579,780	1,794,820
MAY 10. By the S. S. *Tjisondari*, at San Francisco.				
The Goodyear Tire & Rubber Co.	Batavia	Akron	65,520	
Aldens' Successors, Inc.	Soerabaya	New York	46,440	
Various	Soerabaya	New York	69,660	
Various	Batavia	Akron	12,240	193,860
MAY 10. By the S. S. *Hague Maru*, at New York.				
Raw Products Co.....	Singapore	New York	90,000	
F. R. Henderson & Co..	Singapore	New York	669,320	
Everett, Heaney & Co..	Singapore	New York	47,880	
Rubber Trading Co.....	Singapore	New York	33,600	
L. Littlejohn & Co., Inc.	Singapore	New York	201,600	
Meyer & Brown, Inc....	Singapore	New York	94,500	
Chas. T. Wilson Co., Inc.	Singapore	New York	686,520	
G. Kawahara Co.	Singapore	New York	410,220	
Mitsui & Co., Ltd.....	Singapore	New York	100,800	
Thornett & Fehr, Inc...	Singapore	New York	91,080	
Henderson, Forbes & Co.	Singapore	New York	28,800	
The Goodyear Tire & Rubber Co.	Singapore	Akron	39,420	
Vernon Metal & Produce Co.	Singapore	New York	45,000	
Firestone Tire & Rubber Co.	Singapore	New York	705,600	
Various	Singapore	New York	656,640	3,900,980
MAY 10. By the S. S. *Chipana*, at New York.				
Arthur Meyer & Co., Ltd.	London	New York	9,720	
General Rubber Co.....	London	New York	473,380	
Adolph Hirsch & Co....	London	New York	247,920	
C. W. Hartrodt & Co., Limited	London	New York	36,360	
Wilson, Holgate & Co., Limited	London	New York	77,400	
Meyer & Brown, Inc....	London	New York	112,000	
Various	London	New York	1,322,280	2,279,060

	Shipment from:	Shipped to:	Pounds.	Totals.
MAY 11. By the S. S. *Suveric*, at New York.				
L. Littlejohn & Co., I	East	New York	67,200	
MAY 11. By the S. S. *Philadelphia*, at New York.				
Various	London	New York	523,800	523,800
MAY 13. By the S. S. *Amur Maru*, at San Francisco.				
Mitsui & Co., Limited..	Singapore	San Francisco	57,000	57,000
MAY 14. By the S. S. *Remouski*, at New York.				
Thornett & Fehr, Inc...	London	New York	2,160	
Henry Rogers Winthrop.	London	New York	62,820	
T. D. Downing & Co...	London	New York	73,440	
William Brandt & Sons.	London	New York	221,580	
Various	London	New York	73,440	433,440
MAY 16. By the S. S. *West Ira*, at New York.				
Gates Rubber Co.....	Hongkong	Denver	50,400	50,400
MAY 17. By the S. S. *Ceylon Maru*, at New York.				
L. Littlejohn & Co., Inc.	Colombo	New York	89,600	
Various	Colombo	New York	195,660	285,260
MAY 17. By the S. S. *Minnekahda*, at New York.				
Meyer & Brown, Inc...	London	New York	44,800	
Various	London	New York	9,540	54,340
MAY 17. By the S. S. *Noordam*, at New York.				
L. Littlejohn & Co., Inc.	Java	New York	224,000	224,000
MAY 17. By the S. S. *Caronia*, at New York.				
General Rubber Co.....	Liverpool	New York	172,980	
Thornett & Fehr, Inc..	Liverpool	New York	24,480	
Irwin-Harrisons & Crosfield, Inc.	Liverpool	New York	11,160	208,620
MAY 17. By the S. S. *Baltic*, at New York.				
The B. F. Goodrich Co.	Liverpool	Akron	42,120	
Various	Liverpool	New York	1,800	43,920
MAY 18. By the S. S. *Tiger*, at New York.				
Mitsui & Co., Limited..	Batavia	New York	54,000	
The Goodyear Tire & Rubber Co.	Batavia	Akron	50,040	
Winter, Ross & Co.....	Batavia	New York	26,820	
Fred Stern & Co.....	Batavia	New York	16,920	
The Fisk Rubber Co...	Batavia	Chicopee Falls	28,620	
L. Littlejohn & Co., Inc.	Batavia	New York	53,280	
Poel & Kelly.....	Batavia	New York	123,480	
Meyer & Brown, Inc...	Batavia	New York	22,400	
Firestone Tire & Rubber Co.	Batavia	Agron	101,520	
Various	Batavia	New York	186,660	
Mitsui & Co., Limited..	Soerabaya	New York	277,560	
Fred Stern & Co.....	Soerabaya	New York	48,780	
L. Littlejohn & Co., Inc.	Soerabaya	New York	287,820	
Various	Soerabaya	New York	1,980	
Aldens' Successors, Inc.	Singapore	New York	12,600	
Fred Stern & Co.....	Singapore	New York	20,520	
The Goodyear Tire & Rubber Co.	Singapore	Akron	205,200	
Various	Singapore	New York	271,620	
Various	Penang	New York	142,020	
Thornett & Fehr, Inc...	Belawan	New York	40,860	
General Rubber Co.....	Belawan	New York	513,000	
The Goodyear Tire & Rubber Co.	Colombo	Akron	94,680	
Edward Maurer Co., Inc.	Colombo	New York	165,780	
L. Littlejohn & Co., Inc.	Colombo	New York	796,000	
J. Aron & Co.....	Colombo	New York	31,860	
Chas. T. Wilson Co., Inc.	Colombo	New York	428,760	
The B. F. Goodrich Co.	Colombo	Akron	82,260	
Poel & Kelly.....	Colombo	New York	127,800	
Firestone Tire & Rubber Co.	Colombo	Akron	9,540	
United Malaysian Rubber Co., Limited	Colombo	New York	22,320	
Rubber Trading Co.....	Colombo	New York	4,480	
Various	Colombo	New York	684,240	4,933,420
MAY 18. By the S. S. *Moorish Prince*, at New York.				
Edward Boustead & Co.	Penang	New York	156,060	
The Goodyear Tire & Rubber Co.	Penang	Akron	57,600	
Thornett & Fehr, Inc...	Penang	New York	79,200	
W. R. Grace & Co.....	Penang	New York	49,860	
Various	Penang	New York	210,960	
L. Littlejohn & Co., Inc.	Singapore	New York	275,220	
The B. F. Goodrich Co.	Singapore	Akron	255,600	
Balfour, Williamson & Co.	Singapore	New York	219,060	
Poel & Kelly.....	Singapore	New York	423,540	
Fred Stern & Co.....	Singapore	New York	349,200	
F. R. Henderson & Co..	Singapore	New York	208,440	
C. F. McPhillips.....	Singapore	New York	5,580	
Thos. A. Desmond & Co.	Singapore	New York	201,060	
The Goodyear Tire & Rubber Co.	Singapore	New York	612,900	
Vernon Metal & Produce Co.	Singapore	New York	41,400	
Raw Products Co.....	Singapore	New York	43,200	
Chas. T. Wilson Co., Inc.	Singapore	New York	388,260	
Aldens' Successors, Inc.	Singapore	New York	90,540	
J. Aron & Co.....	Singapore	New York	50,400	
Rogers-Pyatt Shellac Co.	Singapore	New York	30,600	
Mitsui & Co., Limited..	Singapore	New York	73,440	
Thornett & Fehr, Inc...	Singapore	New York	99,000	
Various	Singapore	New York	1,521,180	
L. Littlejohn & Co., Inc.	Pt. Sw't'nh'm	New York	672,000	
Rubber Trading Co....	Singapore	New York	56,000	6,170,300
MAY 18. By the S. S. *Vasconia*, at New York.				
Various	London	New York	388,080	388,080

	Shipment from:	Shipped to:	Pounds.	Totals.
MAY 19. By the S. S. *Westra*, at San Francisco.				
Various	Hongkong	San Francisco	50,400	50,400
MAY 20. By the S. S. *Adriatic*, at New York.				
Baring Bros.	London	New York	169,740	169,740
MAY 20. By the S. S. *Antilachus*, at New York.				
Meyer & Brown, Inc.	Singapore	New York	134,000	
United States Rubber Co.	Singapore	New York	474,380	
L. Littlejohn & Co., Inc.	Singapore	New York	201,600	
The Fisk Rubber Co.	Singapore	Chicopee Falls	382,500	
Thos. A. Desmond & Co.	Singapore	New York	189,040	
F. R. Henderson & Co.	Singapore	New York	307,700	
Aldens' Successors, Inc.	Singapore	New York	30,600	
Thornett & Fehr, Inc.	Singapore	New York	46,620	
Poel & Kelly	Singapore	New York	4,140	
Edward Maurer & Co., Inc.	Singapore	New York	285,840	
J. T. Johnstone & Co., Inc.	Singapore	New York	50,400	
Rubber Importers & Dealers' Co., Inc.	Singapore	New York	318,320	
Robinson & Co.	Singapore	New York	28,080	
Pacific Trading Corp. of America	Singapore	New York	211,500	
The Goodyear Tire & Rubber Co.	Singapore	Akron	950,940	
Various	Singapore	New York	1,269,720	
Balfour, Williamson Co.	Singapore	New York	31,680	
Winter, Ross & Co.	Singapore	New York	19,440	
Fred Stern & Co.	Singapore	New York	10,620	
Chas. T. Wilson Co., Inc.	Singapore	New York	86,400	
Eastern Rubber Co.	Singapore	New York	20,160	
F. R. Henderson & Co.	Pt. Sw't'nh'm	New York	48,420	
Edward Boustead & Co.	Pt. Sw't'nh'm	New York	53,820	
Thornett & Fehr, Inc.	Pt. Sw't'nh'm	New York	52,200	
L. Littlejohn & Co., Inc.	Pt. Sw't'nh'm	New York	138,960	
Various	Pt. Sw't'nh'm	New York	88,200	
Fred Stern & Co.	Delhi	New York	110,700	
L. Littlejohn & Co., Inc.	Delhi	New York	52,920	
East Asiatic Co., Inc.	Delhi	New York	4,500	
Aldens' Successors, Inc.	Delhi	New York	104,220	
The Fisk Rubber Co.	Delhi	Chicopee Falls	25,740	
Firestone Tire & Rubber Co.	Delhi	Akron	161,300	
Various	Delhi	New York	314,820	
Joosten & Janssen	Penang	New York	27,000	
Pacific Trading Corp. of America	Penang	New York	95,400	
Various	Penang	New York	162,180	6,494,060
MAY 21. By the S. S. *West Neris*, at San Francisco.				
Various	Belawan	San Fran.	583,020	
Various	Singapore	San Fran.	527,320	
Various	Batavia	San Fran.	147,240	
Various	Eastern Cities	San Fran.	1,239,840	2,497,420
MAY 21. By the S. S. *Higho*, at San Francisco.				
Various	Kobe	San Fr'c'co	28,080	28,080

CENTRALS.

APRIL 26. By the S. S. *Pastores*, at New York.				
Isaac Brandon & Bros.	Cristobal	New York	450	450
APRIL 26. By the S. S. *Monterey*, at New York.				
Armendaiz Bros., Inc.	Vera Cruz	New York	4,200	4,200
APRIL 29. By the S. S. *Gen. W. C. Gorgas*, at New York.				
G. Amsinck & Co., Inc.	Cristobal	New York	900	
Hamberger-Polhemus Co.	Cristobal	New York	3,450	
Various	Cristobal	New York	150	4,500
MAY 3. By the S. S. *Colon*, at New York.				
J. S. Sembrada & Co., Inc.	Tumaco	New York	937	937
MAY 4. By the S. S. *Canto*, at New York.				
Harburger & Stack	Havana	New York	1,000	1,000
MAY 10. By the S. S. *Cristobal*, at New York.				
G. Amsinck & Co., Inc.	Cristobal	New York	66,150	
J. S. Sembrada & Co.	Cristobal	New York	380	
Andean Trading Co.	Cristobal	New York	15,000	
Wellman, Peck & Co.	Cristobal	New York	2,100	
Isaac Brandon & Bros.	Cristobal	New York	150	
Various	Cristobal	New York	8,550	92,330
MAY 10. By the S. S. *Ebro*, at New York.				
Ultramares Corp.	Tulenhuano	New York	3,150	3,150
MAY 10. By the S. S. *Gen. Geo. W. Goethals*, at New York.				
Andean Trading Co.	Cristobal	New York	3,000	
Fidanque Bros. & Sons.	Cristobal	New York	2,250	5,250
MAY 16. By the S. S. *Maraval*, at New York.				
G. Amsinck & Co., Inc.	Port of Spain	New York	21,750	21,750
MAY 17. By the S. S. *Gen. O. H. Ernst*, at New York.				
G. Amsinck & Co., Inc.	Cristobal	New York	8,850	8,850
MAY 20. By the S. S. *Tivives*, at New York.				
Various	Cristobal	New York	1,950	1,950
MAY 21. By the S. S. *Panama*, at New York.				
Wellman, Peck & Co.	Cristobal	New York	150	
G. Amsinck & Co., Inc.	Cristobal	New York	39,150	
J. T. Johnstone & Co., Inc.	Cristobal	New York	21,000	60,300

AFRICANS.

	Shipment from:	Shipped to:	Pounds.	Totals.
APRIL 13. By the S. S. *West Hematite*, at New York.				
A. D. Straus & Co.	Bordeaux	New York	1,001,430	
Poel & Kelly	Bordeaux	New York	10,382,040	
Rubber Importers & Dealers' Co., Inc.	Bordeaux	New York	147,840	
Various			2,241,200	13,772,510
APRIL 15. By the S. S. *Patria*, at New York.				
C. B. Richards & Co.	Marseilles	New York	90,000	90,000
APRIL 19. By the S. S. *Nilemade*, at New York.				
British & African Trading Co.	Dakar	New York	6,480	6,480
APRIL 19. By the S. S. *Storvicken*, at New York.				
Poel & Kelly	Marseilles	New York	4,205	4,205
APRIL 19. By the S. S. *Bereby*, at New York.				
Various	Africa	New York	21,420	21,420
APRIL 19. By the S. S. *McKeesport*, at New York.				
Various	Havre	New York	63,720	63,720
APRIL 19. By the S. S. *Dunkirk*, at New York.				
Various	Beira	New York	1,620	1,620
APRIL 20. By the S. S. *Verbania*, at New York.				
Poel & Kelly	Liverpool	New York	91,199	91,199
APRIL 20. By the S. S. *Issawatomie*, at Boston.				
Hood Rubber Co.	Antwerp	Watertown	111,957	111,957
APRIL 23. By the S. S. *Port Bowen*, at New York.				
Rubber Trading Co.	London	New York	112,000	
Meyer & Brown, Inc.	Liverpool	New York	11,200	123,200
APRIL 27. By the S. S. *Siberian Prince*, at New York.				
Poel & Kelly	Havre	New York	22,500	22,500
APRIL 28. By the S. S. *Kroonland*, at New York.				
Various	Antwerp	New York	139,680	139,680
MAY 3. By the S. S. *Glenshane*, at New York.				
Edward Boustead & Co.	Singapore	New York	7,130	7,130
MAY 4. By the S. S. *Remus*, at New York.				
Various	Bordeaux	New York	22,343	22,343
MAY 4. By the S. S. *Niagara*, at New York.				
Poel & Kelly	Havre	New York	2,990	
Huth & Co.	Havre	New York	106,030	
Joosten & Janssen	Bordeaux	New York	67,200	176,220
MAY 5. By the S. S. *Vallavia*, at New York.				
Rubber Trading Co.	London	New York	2,240	2,240
MAY 7. By the S. S. *Buitenzorg*, at New York.				
Rubber Trading Co.	Singapore	New York	44,800	44,800
MAY 13. By the S. S. *Roma*, at New York.				
Carleton & Mott	Marseilles	New York	47,250	
Various	Marseilles	New York	200,445	247,695
MAY 14. By the S. S. *Okesa*, at New York.				
Various	Lisbon	New York	24,315	24,315
MAY 15. By the S. S. *Noordam*, at New York.				
Poel & Kelly	Rotterdam	New York	246,780	
Various	Rotterdam	New York	207,180	453,960
MAY 17. By the S. S. *Moorish Prince*, at New York.				
Rubber Trading Co.	Singapore	New York	159,040	159,040
MAY 17. By the S. S. *Baltic*, at New York.				
Meyer & Brown, Inc.	Liverpool	New York	11,200	11,200
MAY 19. By the S. S. *Okesa*, at New York.				
William Schall & Co.	Portugal	New York	65,462	65,462
MAY 20. By the S. S. *Antilochus*, at New York.				
Joosten & Janssen	Singapore	New York	33,600	33,600

BALATA.

APRIL 19. By the S. S. *Matura*, at New York.				
Middleton & Co., Limited	Trinidad	New York	1,135	
Middleton & Co., Limited	Demerara	New York	2,942	4,077
MAY 10. By the S. S. *Cristobal*, at New York.				
Neuss, Hesslein & Co.	Cristobal	New York	1,372	
J. S. Sembrada & Co.	Cristobal	New York	1,862	
American Trading Co.	Cristobal	New York	4,802	8,036
MAY 16. By the S. S. *Maraval*, at New York.				
Southern Sales Corp.	Port of Spain	New York	13,622	
Various	Port of Spain	New York	196	13,818
MAY 17. By the S. S. *Yarmouth*, at New York.				
H. Marquardt & Co., Inc.	Kingston	New York	750	750
MAY 20. By the S. S. *Tivives*, at New York.				
Ultramares Corp.	Cristobal	New York	7,350	7,350
MAY 21. By the S. S. *Panama*, at New York.				
G. Amsinck & Co., Inc.	Cristobal	New York	1,200	
Fidanque Bros. & Sons.	Cristobal	New York	5,400	
Hollinghurst & Co.	Cristobal	New York	1,350	
Various	Cristobal	New York	900	8,850

PONTIANAK.

	Shipment from:	Shipped ao:	Pounds.	Totals.
MAY 3. By the S. S. *Glenchane*, at New York.				
Various	Singapore	New York	216,000	216,000
MAY 5. By the S. S. *Aristo*, at New York.				
Poel & Kelly	Singapore	New York	57,600	57,600
MAY 7. By the S. S. *Buitenzorg*, at New York.				
United Malaysian Rubber Co., Limited	Penang	New York	84,000	
Various	Penang	New York	74,400	158,400
MAY 10. By the S. S. *Hague Maru*, at New York.				
Various	Singapore	New York	29,100	29,100
MAY 18. By the S. S. *Moorish Prince*, at New York.				
Sanderson & Son	Singapore	New York	57,600	
United Malaysian Rubber Co., Limited	Singapore	New York	579,961	
Fred Stern & Co.	Singapore	New York	24,000	
Baring Bros.	Singapore	New York	116,700	
Various	Singapore	New York	112,500	890,761
MAY 20. By the S. S. *Antilochus*, at New York.				
Baring Brothers	Singapore	New York	49,200	
E. Everett Carleton & Co.	Singapore	New York	44,700	93,900
MAY 21. By the S. S. *West Neris*, at San Francisco.				
Various	Singapore	San Franc'co	11,400	11,400

MANICOBAS.

MAY 12. By the S. S. *Alban*, at New York.				
Various	Ceara	New York	58,740	58,740

GUAYULE.

APRIL 26. By rail at Eagle Pass, Texas.				
Continental-Mexican Rubber Co.	Mexico	Akron	62,150	
Continental-Mexican Rubber Co.	Mexico	New York	52,275	114,425
MAY 5. By rail at Eagle Pass, Texas.				
Continental-Mexican Rubber Co.	Mexico	New York	115,030	
Continental-Mexican Rubber Co.	Mexico	Akron	55,275	170,305

GUTTA PERCHA.

MAY 1. By the S. S. *Vardulia*, at New York.				
Various	London	New York	30,600	30,600

GUTTA SIAK.

APRIL 22. By the S. S. *West Amargosa*, at New York.				
Various	Singapore	New York	125,700	125,700
MAY 18. By the S. S. *Moorish Prince*, at New York.				
United Malaysian Rubber Co., Limited	Singapore	New York	67,200	67,200
MAY 20. By the S. S. *Antilochus*, at New York.				
United Malaysian Rubber Co., Limited	Singapore	New York	134,400	134,400

ANTWERP RUBBER ARRIVALS.

APRIL 9, 1920. By S. S. *Mateba*, from the Congo.	
Bungé et Cie ..... *kilos*	7,973
Bungé et Cie (Compagnie du Kassai)	67,225
Bungé et Cie (Grand Lacs)	1,640
Bungé et Cie (Belgika)	12,047
Bungé et Cie (Crédit Colonial et Commercial)	13,875
Various	8,893
Total ..... *kilos*	111,653
APRIL 9, 1920. By the S. S. *Anversville*, from the Congo.	
Bungé et Cie ..... *kilos*	10,477
Bungé et Cie (Grand Lacs)	3,038
Société Coloniale Anversoise (Compagnie du Kassai)	30,090
Société Coloniale Anversoise (Compagnie Française du Bas Congo)	31,110
Total ..... *kilos*	74,715

(Compiled by Grisar & Co., Antwerp.)

EXPORTS OF INDIA RUBBER FROM PARA MANAOS AND IQUITOS DURING THE MONTH OF MARCH, 1920

	NEW YORK.					EUROPE.					Grand
EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Totals.
Alfredo Valle & Co. ..... *kilos*	187,304	5,100	77,300	52,500	322,204	154,420	21,999	6,003	22,751	205,173	527,377
General Rubber Co.	74,279	7,476	70,456	68,387	220,598	15,357	1,213	3,362	.....	19,932	240,530
Berringer & Co.	75,285	8,116	74,423	29,692	187,516	.....	.....	.....	.....	.....	187,516
Stowell & Co.	28,159	6,706	52,192	13,131	100,188	38,044	.....	1,334	.....	39,378	139,566
Suarez, Filho & Co.	5,336	185	25,293	27,270	58,084	81,202	.....	.....	.....	81,202	139,286
J. Marques	16,268	16,506	33,609	33,111	99,494	.....	.....	.....	.....	.....	99,494
Adelbert H. Alden, Limited.	.....	6,300	7,437	1,818	15,555	68,298	.....	.....	.....	68,298	83,853
Bitar Irmãos	.....	.....	.....	42,720	42,720	24,140	5,610	1,120	.....	30,870	73,590
Ferreira, Costa & Co.	6,290	400	13,240	.....	19,930	10,000	.....	.....	.....	10,000	29,930
Sundries	3,615	.....	5,935	25,470	35,020	34,292	724	480	.....	35,496	70,516
	396,536	50,789	359,885	294,099	1,101,309	425,753	29,546	12,299	22,751	490,349	1,591,658
From Manáos	251,243	45,000	151,723	232,276	680,242	236,286	9,295	16,991	1,019	263,591	943,833
From Iquitos	185,247	4,049	26,928	74,793	291,017	.....	.....	.....	.....	.....	291,017
Totals	833,026	99,838	538,536	601,168	2,072,568	662,039	38,841	29,290	23,770	753,940	2,826,508

(Compiled by Stowell & Co., Pará, Brazil.)

EXPORTS OF INDIA RUBBER FROM MANAOS DURING THE MONTH OF MARCH, 1920

	NEW YORK.					EUROPE.					Grand
EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Totals.
General Rubber Co. of Brazil. *kilos*	233,860	51,320	59,911	187,689	532,780	48,983	3,517	4,000	.....	56,500	589,280
Tancredo, Porto & Co.	54,056	16,143	95,422	89,642	255,263	95,914	863	5,243	.....	103,020	358,283
Ohliger & Co.	76,458	18,423	25,418	167,557	287,856	.....	.....	.....	.....	.....	287,856
Stowell & Co.	18,107	8,106	29,112	57,334	112,659	36,339	.....	4,298	.....	40,637	153,296
Adelbert H. Alden, Limited.	170	256	15,321	121	15,868	89,849	3,093	235	322	93,499	109,367
Y. G. Araujo.	.....	.....	.....	.....	33,109	.....	.....	.....	.....	.....	33,109
A. Souza	1,281	177	25,723	5,928	.....	14,993	1,822	2,215	697	19,727	19,727
Higson & Fall.	13,580	1,762	460	.....	15,802	.....	.....	.....	.....	.....	15,802
Moraes, Carneiro & Co.	11,446	640	373	.....	12,459	.....	.....	.....	.....	.....	12,459
Madeira-Mamoré Railway Co.	.....	.....	.....	.....	.....	9,500	.....	.....	.....	9,500	9,500
G. Deffner & Co.	3,159	.....	1,002	892	5,053	.....	.....	.....	.....	.....	5,053
Corrêa & Irmãos.	100	.....	.....	.....	100	.....	.....	.....	.....	.....	100
	412,217	96,827	252,742	509,163	1,270,949	295,578	9,295	16,991	1,019	322,883	1,593,832
In transit, Iquitos.	10,289	30,024	7,867	12,302	60,482	.....	.....	.....	.....	.....	60,482
	422,506	126,851	260,609	521,465	1,331,431	295,578	9,295	16,991	1,019	322,883	1,654,314

(Compiled by Stowell & Co., Pará, Brazil.)

EXPORTS OF INDIA RUBBER FROM MANAOS DURING THE MONTH OF FEBRUARY, 1920.

	NEW YORK.					EUROPE.					GRAND
EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.	TOTALS.
Tancredo, Porto & Co. ..... *kilos*	11,560	25,840	56,990	117,991	212,381	470,235	30,499	22,661	1,120	524,515	736,896
Stowell & Co.	56,726	31,895	30,360	33,635	152,616	26,010	4,320	6,482	.....	36,812	189,428
Ohliger & Co.	64,217	2,030	8,297	48,855	123,399	46,762	.....	.....	.....	46,762	170,161
General Rubber Co. of Brazil.	43,880	13,260	15,700	.....	72,840	77,450	14,470	5,000	.....	96,920	169,760
J. A. Mendes & Co.	.....	6,602	11,595	23,403	41,600	71,075	98	.....	.....	71,173	112,773
Adelbert H. Alden, Ltd.	.....	.....	1,590	12,319	13,909	62,149	3,665	886	257	66,957	80,866
A. Souza	589	5	43,431	21,392	65,417	.....	.....	.....	.....	.....	65,417
Higson & Fall.	.....	.....	.....	.....	.....	28,248	3,588	975	.....	32,811	32,811
Amorim Irmãos	4,160	4,160	2,620	.....	10,940	20,000	.....	.....	.....	20,000	30,940
B. Lévy & Co.	.....	.....	.....	.....	.....	18,812	2,119	1,305	.....	22,236	22,236
Moraes Carneiro & Co.	7,360	320	690	.....	8,370	4,942	960	710	39	6,651	15,021
Esbabá & Lévy.	.....	.....	.....	.....	.....	13,100	533	302	.....	13,935	13,935
G. Deffner & Co.	6,174	.....	1,243	2,264	9,681	.....	.....	.....	.....	.....	9,681
Paulo Lévy & Co.	.....	.....	.....	.....	.....	3,220	320	415	.....	3,955	3,955
Vianna, Lyra & Co.	960	.....	.....	.....	960	.....	.....	.....	.....	.....	960
Totals	195,626	84,112	172,516	259,859	712,113	842,003	60,572	38,736	1,416	942,727	1,654,840
In transit from Iquitos.	56,379	132,917	26,928	74,793	291,017	2,383	280	631	2,257	5,551	296,568
Totals	252,005	217,029	199,444	334,652	1,003,130	844,386	60,852	39,367	3,673	948,278	1,951,408

(Compiled by Stowell & Co., Manáos, Brazil.)

STATISTICS OF CRUDE AND MANUFACTURED RUBBER AT THE PORT OF NEW YORK.

JANUARY, FEBRUARY, AND MARCH—1919 AND 1920.

IMPORTS.

UNMANUFACTURED—*free:*	January.				February.				March.			
	1919.		1920.		1919.		1920.		1919.		1920.	
Crude rubber—From:	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Belgium	.....	.....	298,903	$90,518	.....	.....	340,926	$96,699	.....	.....	229,812	$105,003
France	.....	.....	490,968	198,476	.....	.....	827,307	243,229	181,784	$50,403	681,507	216,758
Italy	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	600,396	302,226
Netherlands	.....	.....	1,522,588	722,320	.....	.....	2,586,622	1,123,583	.....	.....	508,979	234,584
Portugal	.....	.....	67,461	33,730	.....	.....	220,462	44,000	.....	.....	590,983	153,832
England	11,200	$4,480	16,575,904	7,762,677	1,093,777	$424,470	15,383,717	7,312,311	7,423,948	3,656,529	11,807,228	5,261,580
British Honduras	.....	.....	.....	.....	454	113	.....	.....	.....	.....	.....	.....
Canada	4,402	1,453	.....	.....	319,009	160,056	.....	.....	1,069,318	537,484	.....	.....
Costa Rica	13,340	3,860	623	551	5,827	2,465	.....	.....	418	65	.....	.....
Guatemala	1,888	402	942	235	.....	.....	2,518	503	3,967	824	.....	.....
Honduras	.....	.....	446	182	5,727	1,916	910	265	1,203	353	.....	.....
Nicaragua	13,659	4,009	12,996	3,578	22,026	7,771	2,750	1,173	45,310	14,772	22,929	6,103
Panama	.....	.....	4,200	1,453	1,594	248	1.084	395	7,184	2,837	4,581	891
Salvador	.....	.....	2,775	1,422	.....	.....	.....	.....	.....	.....	540	135
Mexico	215,774	56,307	43,441	11,167	67,408	20,222	37,007	11,106	.....	.....	50,918	20,731
Trinidad	.....	.....	9,628	4,836	580	195	4,245	3,203	1,504	302	.....	.....
Haiti	.....	.....	794	272	.....	.....	.....	.....	.....	.....	.....	.....
Bolivia	.....	.....	1,843	449	.....	.....	20,397	7,910	.....	.....	25,328	9,511
Brazil	5,354,280	1,892,068	4,233,199	1,405,944	5,937,411	1,870,353	3,807,367	1,177,767	6,439,808	2,046,296	5,195,613	1,586,260
Colombia	25,551	7,467	117,609	45,286	125,256	49,912	88,071	28,162	24,516	10,169	28,249	9,261
Ecuador	7,496	1,983	151,002	37,849	72,673	25,068	287,998	59,122	166,218	53,224	48,485	11,979
British Guiana	7,147	5,718	4,078	1,956	.....	.....	5,973	5,449	.....	.....	5,205	3,449
Peru	.....	.....	176,721	65,118	1,171,859	391,455	1,722,297	557,203	1,666,827	556,936	.....	.....
Uruguay	.....	.....	.....	.....	.....	.....	23,586	9,800	.....	.....	.....	.....
Venezuela	3,487	6,789	724	229	7,523	1,766	93,460	35,369	15,136	5,229	5,514	2,002
British India	.....	.....	282,195	110,812	.....	.....	301,293	139,066	.....	.....	215,615	91,362
Straits Settlements	2,026,297	685,743	17,757,741	7,440,299	2,619,426	704,328	21,732,218	9,393,584	7,069,282	2,452,702	34,750,472	16,908,820
British East Indies	740,858	294,569	7,781,126	3,127,447	3,063,747	1,362,438	7,128,151	2,921,947	4,379,157	1,760,734	4,356,545	1,811,948
Dutch East Indies	2,758,101	892,013	5,592,603	2,445,439	1,687,027	513,955	2,007,125	671,077	665,745	228,221	10,279,607	4,586,862
Hongkong	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	112,374	48,236
Japan	324,975	84,120	175,512	86,564	.....	.....	.....	.....	.....	.....	452,795	225,429
Philippines	12,251	5,800	.....	.....	15,065	7,533	61,618	23,764	37,637	17,650	.....	.....
British W. Africa	71,122	14,457	107,663	53,831	78,400	19,600	.....	.....	.....	.....	.....	.....
French Africa	.....	.....	.....	.....	77,620	23,287	.....	.....	.....	.....	.....	.....
Totals	11,591,828	$3,961,238	55,413,685	$23,652,640	16,372,409	$5,587,151	56,687,102	$23,866,687	29,198,962	$11,394,730	69,973,675	$31,596,962
Jelutong	.....	.....	1,211,332	171,775	.....	.....	1,292,316	156,414	749,904	159,187	1,052,426	164,260
Gutta percha	414,547	32,978	816,999	133,742	.....	.....	252,215	52,629	711,727	107,826	533,955	96,585
Balata	56,132	28,333	494,561	292,266	87,500	47,355	328,295	184,289	39,804	24,344	61,035	32,289
Rubber scrap and reclaimed	165,902	9,639	610,858	53,210	200,406	9,468	673,220	57,508	157,978	9,992	991,603	68,097
Total unmanufactured	12,228,409	$4,032,188	58,547,435	$24,303,633	16,660,315	$5,643,974	59,233,158	$24,317,527	30,858,375	$11,696,079	72,612,694	$31,958,193
Chicle ...*dutiable*	1,101,223	558,168	474,224	603,306	.....	.....	453,054	353,013	523,437	328,466	649,546	509,087
Rubber substitutes	.....	.....	.....	.....	269	29	11,200	2,017	.....	.....	.....	.....
Manufactures of india rubber and gutta percha—*dutiable*	.....	$23,229	.....	$55,650	.....	$31,446	.....	$27,949	.....	$43,123	.....	$71,338

EXPORTS.

MANUFACTURED:												
Automobile tires	.....	$1,202,668	.....	$2,573,773	.....	$1,334,304	.....	$3,199,706	.....	$1,256,011	.....	$3,624,172
Inner tubes	.....	.....	.....	40,145	.....	.....	.....	142,146	.....	.....	.....	480,309
Solid tires	.....	.....	.....	26,920	.....	.....	.....	141,519	.....	.....	.....	414,413
All other tires	.....	71,506	.....	117,466	.....	43,197	.....	52,731	.....	86,980	.....	70,490
Belting	.....	374,461	.....	119,441	.....	316,067	.....	109,893	.....	.....	.....	195,944
Hose	.....	.....	.....	41,567	.....	.....	.....	202,368	.....	.....	.....	76,949
Packing	.....	.....	.....	17,890	.....	.....	.....	68,962	.....	.....	.....	96,777
Rubber boots	4,606	17,648	21,842	88,189	3,297	9,544	24,658	97,200	2,906	12,603	14,140	36,973
Rubber shoes	59,231	47,428	951,777	1,000,552	88,795	72,663	743,205	887,062	441,451	278,896	824,632	741,126
Soles and heels	.....	.....	.....	13,787	.....	.....	.....	47,222	.....	.....	.....	60,155
Druggists' sundries	.....	42,653	.....	60,606	.....	48,193	.....	90,766	.....	64,710	.....	131,905
Other manufactures of rubber	.....	375,174	.....	432,653	.....	619,051	.....	378,918	.....	412,233	.....	468,051
Totals, manufactured	.....	$2,131,538	.....	$4,532,989	.....	$2,443,019	.....	$5,418,493	.....	$2,111,433	.....	$6,396,264
Insulated wire	.....	$45,921	.....	619,109	.....	595,688	.....	500,687	.....	957,628	.....	507,189
Fountain pens	11,217	8,625	32,929	34,440	27,935	27,652	17,358	13,895	15,995	20,183	19,147	24,144
Suspenders and garters	.....	180,375	.....	170,591	.....	126,594	.....	236,503	.....	244,216	.....	280,491
Chewing gum	.....	197,537	.....	257,582	.....	86,496	.....	277,561	.....	99,057	.....	320,918
UNMANUFACTURED:												
Reclaimed and scrap rubber	196,227	$10,497	361,108	$48,855	456,722	$63,471	285,365	$37,200	172,688	$30,898	403,990	$45,508

EXPORTS OF FOREIGN MERCHANDISE.

UNMANUFACTURED:												
India rubber	.....	.....	64,960	$25,303	58,676	$37,534	.....	.....	.....	.....	94,040	$45,605
Balata	50,300	30,884	54,958	32,698	32,000	19,585	34,000	19,135	.....	.....	83,390	46,976
Gutta percha	500	2,250	.....	.....	10,205	2,179	.....	.....	.....	.....	.....	.....
Totals	50,800	$33,134	119,918	$58,001	100,881	$59,298	34,000	$19,135	.....	.....	177,430	$92,581
Rubber substitutes	.....	.....	.....	.....	.....	.....	14,504	10,353	.....	.....	17	9
India rubber manufactures	.....	.....	.....	.....	.....	.....	.....	1,034	.....	.....	.....	1,398

EXPORTS OF INDIA RUBBER MANUFACTURERS AND INSULATED WIRE AND CABLE FROM THE UNITED STATES BY COUNTRIES, DURING THE MONTH OF MARCH, 1920.

EXPORTED TO—	Belting.	Hose.	Packing.	Boots.		Shoes.		Soles and Heels.	Automobile Tires. Casings.	Inner Tubes.	Solid Tires.	All Others.	Insulated Wire and Cables.	Druggists' Rubber Sundries.	All Other Manufactures of Rubber.	Totals.
EUROPE:	Value.	Value.	Value.	Pairs.	Value.	Pairs.	Value.	Value.	Value.	Value.	Value.	Value.	Value.	Value.	Value.	Value.
Austria	.....	.....	.....	.....	.....	.....	.....	.....	$19,943	.....	.....	.....	.....	.....	$1,601	$21,544
Azores and Madeira Is.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23	23
Belgium	.....	.....	$549	.....	.....	5,012	$3,642	.....	146,395	$3,433	$31,001	.....	$7,411	$76	12,850	205,357
Bulgaria	.....	.....	.....	.....	.....	36	49	.....	.....	.....	.....	.....	.....	.....	3	52
Denmark	$17	$402	.....	4,706	$8,016	22,564	20,709	.....	50,562	13,545	34,451	$1,154	2,699	5,011	13,396	149,962
Finland	10,776	2,115	507	.....	.....	115,015	97,992	.....	19,998	2,400	9,680	20	121	.....	2,005	145,611
France	2,108	77	1,256	.....	.....	34,932	25,989	$3,950	$90,748	44,290	12,150	11,027	5,161	3,992	75,393	776,141
Germany	.....	.....	.....	.....	.....	.....	.....	.....	108,123	607	11,143	10	.....	250	6,990	127,123
Greece	1,197	310	.....	36	198	250	238	146	36,995	6,909	3,409	186	3,417	360	1,267	54,672
Iceland and Faroe Is.	.....	.....	.....	5,779	17,369	3,022	3,053	.....	2,046	44	.....	.....	.....	.....	3,901	26,417
Italy	2,635	197	771	27	144	31,898	30,738	.....	87,979	7,079	.....	.....	15,283	15,822	4,776	165,423
Malta, Gozo and Cyprus Is.	.....	.....	.....	.....	.....	.....	.....	.....	.....	179	300	.....	.....	.....	.....	479
Netherlands	3,115	200	249	.....	.....	20,148	19,458	.....	214,903	10,817	13,790	7,091	20,492	3,314	15,480	308,909
Norway	.....	5,939	109	138	543	162,963	126,528	800	90,908	7,254	45,610	.....	48,836	81	8,563	335,171
Poland and Danzig	70	.....	.....	.....	.....	60,347	47,984	.....	16,872	.....	.....	.....	.....	.....	41	64,967
Portugal	803	.....	.....	.....	.....	.....	.....	.....	61,518	6,481	10	2,100	3,569	.....	1,911	76,392
Roumania	798	1,463	599	.....	.....	4,505	8,533	.....	100,683	16,434	.....	.....	14,903	.....	13	143,429
Russia in Europe	.....	.....	.....	.....	.....	1,772	2,015	.....	1,148	168	.....	.....	.....	.....	.....	3,331
Spain	200	904	.....	.....	.....	18,416	18,792	180	128,413	11,146	15,794	2,587	6,227	1,669	6,972	192,884
Sweden	12,311	9,069	911	379	886	43,558	34,237	.....	239,590	24,499	37,090	3,009	15,005	4,924	11,688	393,211
Switzerland	378	.....	.....	.....	.....	6,720	5,094	.....	55,152	328	.....	.....	930	3,780	2,141	67,803
Turkey in Europe	16	.....	.....	326	1,046	3,884	3,794	1,800	5,589	1,999	.....	.....	659	.....	2,008	16,911
England	980	25,999	8,986	11,018	32,052	420,588	300,136	4,617	483,775	124,988	10,073	4,126	29,240	21,443	142,089	1,188,504
Scotland	225	.....	.....	.....	.....	14,346	11,914	.....	31,105	2,358	83	211	.....	80	2,636	48,612
Ireland	.....	.....	.....	.....	.....	.....	.....	2,232	629	.....	.....	7	.....	.....	7	2,875
Jugoslavia, Albania and Fiume	.....	.....	.....	36	120	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	120
TOTALS, EUROPE	$35,629	$46,675	$13,937	22,445	$60,374	969,976	$760,895	$13,725	$2,493,074	$284,958	$224,584	$31,528	$173,953	$60,802	$315,754	$4,515,888
NORTH AMERICA:																
Bermuda	.....	$148	$423	46	$152	156	$169	$279	.....	.....	$340	$100	$1,609	$53	$169	$3,442
British Honduras	.....	16	.....	.....	.....	2,235	4,376	.....	$238	$43	.....	.....	230	10	160	5,073
Canada	$41,662	8,209	13,003	6,091	21,054	8,335	7,617	1,921	179,656	48,515	35,749	94,113	14,680	35,320	188,852	690,351
Costa Rica	32	1,017	433	.....	.....	.....	.....	1,154	1,868	55	244	.....	480	487	924	6,694
Guatemala	1,469	150	310	.....	.....	.....	.....	1,278	4,269	1,142	.....	1,050	587	284	1,989	12,528
Honduras	500	2,365	471	.....	.....	218	215	218	3,005	891	.....	.....	518	93	947	9,223
Nicaragua	596	601	786	.....	.....	.....	.....	2,146	1,191	323	.....	436	1,096	577	232	7,984
Panama	.....	2,993	2,066	24	94	2,202	1,870	2,554	22,026	2,538	13,831	1,352	14,060	663	2,798	66,845
Salvador	429	178	333	.....	.....	.....	.....	9,538	8,761	633	.....	.....	1,439	949	997	23,257
Mexico	13,772	35,174	21,507	34	222	8,806	11,105	4,457	73,635	16,928	5,234	1,202	41,277	7,335	22,852	254,700
Miquelon, Langley, etc.	.....	.....	.....	1,536	5,618	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,618
Newfoundland and Labrador	3,351	1,402	74	3,468	12,697	864	1,207	355	812	157	214	.....	1,520	84	1,015	22,888
Barbados	.....	172	.....	.....	.....	.....	.....	19	3,160	311	.....	151	.....	15	122	3,950
Jamaica	140	1,875	.....	.....	.....	6,932	9,256	1,201	25,174	2,020	893	1,127	496	458	1,329	43,969
Trinidad and Tobago	.....	478	64	.....	.....	.....	.....	127	15,235	2,134	.....	1,306	297	444	872	20,957
Other British West Indies	.....	59	3	.....	.....	60	165	56	1,392	266	369	466	2	37	381	3,196
Cuba	3,765	11,258	3,884	65	414	5,938	6,047	10,893	120,227	5,333	19,430	1,828	34,367	8,389	12,110	237,945
Virgin Islands of the U. S.	.....	7	.....	.....	.....	38	29	270	158	44	.....	476	.....	1	14	999
Dutch West Indies	.....	.....	61	.....	.....	.....	.....	.....	2,956	765	.....	.....	.....	52	366	4,203
French West Indies	230	11	.....	.....	.....	.....	.....	44	1,901	774	1,080	146	83	.....	521	4,790
Haiti	53	74	70	.....	.....	24	37	72	2,701	192	80	150	579	106	687	4,801
Dominican Republic	774	352	876	.....	.....	220	186	658	28,977	5,247	1,645	1,195	825	1,116	3,942	45,793
TOTAL, NORTH AMERICA	$66,773	$66,539	$44,364	11,264	$40,251	36,028	$42,279	$37,240	$497,342	$88,311	$79,019	$105,098	$114,145	$56,473	$241,279	$1,479,203
SOUTH AMERICA:																
Argentina	$1,752	$15,372	$5,019	1,304	$2,534	170	$154	$3,508	$188,783	$38,218	$721	$577	$33,082	$5,599	$27,762	$323,081
Bolivia	1,364	62	120	.....	.....	.....	.....	.....	407	.....	.....	.....	526	550	255	3,284
Brazil	10,012	21,822	1,792	6	45	25,220	24,686	3,567	118,660	16,561	4,217	38	71,498	6,462	20,047	299,407
Chile	35,925	7,559	2,827	.....	.....	6,561	7,903	.....	67,668	8,853	997	3,526	8,515	984	5,033	149,790
Colombia	237	967	978	.....	.....	91	81	1,531	10,993	3,178	413	744	9,893	8,146	3,002	40,163
Ecuador	.....	232	.....	.....	.....	48	61	.....	1,992	495	602	.....	697	302	731	5,112
British Guiana	8,472	80	104	.....	.....	48	35	.....	4,871	1,106	250	.....	923	.....	629	16,470
Dutch Guiana	.....	.....	.....	.....	.....	.....	.....	181	425	50	.....	.....	3	.....	145	804
French Guiana	.....	.....	.....	.....	.....	.....	.....	150	.....	.....	.....	.....	.....	.....	.....	150
Paraguay	2,703	.....	370	.....	.....	.....	.....	.....	73	.....	.....	.....	202	.....	.....	3,348
Peru	855	3,713	3,322	.....	.....	.....	.....	106	19,357	1,041	1,072	364	5,566	1,108	3,205	39,709
Uruguay	215	3,000	2,138	.....	.....	2,016	1,622	1,062	59,142	6,897	2,807	.....	15,584	1,429	5,637	99,533
Venezuela	185	785	442	.....	.....	182	158	799	24,568	2,784	136	342	5,483	4,538	9,561	49,781
TOTALS, SOUTH AMERICA	$61,720	$53,592	$17,112	1,320	$2,579	34,336	$34,700	$10,904	$496,939	$79,183	$11,215	$5,591	$151,972	$29,118	76,007	$1,030,634
OCEANIA:																
Australia	$14,594	$10,690	$1,977	.....	.....	2,688	$2,176	$851	$82,093	$3,526	$7,506	$1,688	$1,447	$5,344	$9,114	$141,006
New Zealand	5,072	114	105	420	$2,775	12,112	17,600	1,348	110,546	14,493	5,700	11,966	3,777	4,001	11,303	188,800
Other Brit. Oceania	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
French Oceania	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Other Oceania	.....	.....	.....	.....	.....	132	147	.....	261	18	402	.....	87	.....	.....	915
Philippine Islands	9,345	6,876	6,255	60	151	5,268	6,159	4,084	43,454	13,098	14,055	2,362	32,003	5,088	15,703	158,633
Abyssinia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	81	81
TOTALS, OCEANIA	$29,011	$17,680	$8,337	480	$2,926	19,600	$26,082	$6,283	$236,354	$31,135	$27,663	$16,016	$37,314	$14,433	$36,201	$489,435

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORY OF THE UNITED STATES.

EXPORTED TO—	Belting, Value.	Hose, Value.	Packing, Value.	Boots. Pairs.	Boots. Value.	Shoes. Pairs.	Shoes. Value.	Soles and Heels. Value.	Automobile Tires. Casings. Value.	Automobile Tires. Inner Tubes. Value.	Automobile Tires. Solid Tires. Value.	Automobile Tires. All Others. Value.	Insulated Wire and Cables. Value.	Druggists' Rubber Sundries. Value.	All Other Manufactures of Rubber. Value.	Totals. Value.
CHINA:																
China	$3,570	$1,200	.....	242	$732	13,690	$8,963	$263	$54,073	$1,615	$5,095	$9,445	$38,609	$3,357	$10,617	$137,539
Chosen	.....	904	.....	.....	.....	.....	.....	.....	2,935	.....	.....	.....	.....	182	.....	4,021
British India	.....	2,819	$1,705	.....	.....	71	50	500	110,721	32,064	35,156	8,044	5,525	3,722	6,987	207,293
Straits Settlements	.....	.....	.....	.....	.....	.....	.....	.....	14,206	1,361	.....	.....	122	.....	803	16,492
Other British East Indies	.....	600	.....	.....	.....	.....	.....	.....	3,134	.....	.....	.....	111	.....	487	4,332
Dutch East Indies	1,119	1,699	.....	.....	.....	.....	.....	.....	92,678	19,298	74,265	648	7,019	.....	5,164	201,890
French East Indies	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	39	.....	39
Hongkong	.....	36	.....	.....	.....	750	792	.....	1,359	26	1,600	69	16	109	1,375	5,384
Japan	30,415	3,633	16,576	1,348	3,199	84,897	116,457	.....	22,290	2,768	1,985	2,312	10,839	923	27,968	239,365
Persia	.....	.....	.....	389	1,342	240	238	.....	.....	.....	.....	.....	.....	.....	.....	238
Russia in Asia	.....	.....	.....	.....	.....	.....	.....	.....	864	.....	.....	52	.....	.....	.....	1,342
Siam	.....	.....	.....	.....	.....	.....	.....	.....	3,046	.....	.....	346	.....	.....	130	1,046
Turkey in Asia	.....	.....	.....	.....	.....	5,400	5,108	11	1,887	.....	.....	.....	.....	6,460	411	14,223
TOTALS, CHINA	$35,104	$10,893	$18,281	1,979	$5,273	105,048	$131,608	$774	$304,147	$57,132	$118,101	$30,916	$62,241	$14,792	$53,942	$833,204
AFRICA:																
Belgian Kongo	.....	$105	.....	.....	.....	2	$2	.....	$388	$6,264	$270	.....	.....	.....	$58	$495
British West Africa	.....	75	.....	.....	.....	.....	.....	.....	50,792	17,003	2,012	$971	$3,252	$2,602	5,198	37,459
British South Africa	$49,215	37,049	$25,763	9	$35	10,968	13,652	$1,632	117,527	.....	.....	.....	.....	.....	.....	275,961
British East Africa	.....	.....	47	.....	.....	.....	.....	.....	2,222	.....	.....	.....	.....	.....	.....	2,339
Canary Islands	.....	.....	.....	.....	.....	.....	.....	.....	271	182	1,500	.....	.....	.....	17	2,371
French Africa	.....	.....	643	.....	.....	.....	.....	.....	1,720	.....	.....	.....	.....	.....	.....	2,562
Liberia	.....	.....	456	.....	.....	.....	.....	.....	.....	.....	.....	.....	669	.....	.....	669
Portuguese Africa	.....	550	.....	.....	.....	.....	.....	.....	19,460	.....	.....	85	.....	20	348	1,459
Egypt	124	2,674	.....	.....	.....	.....	.....	1,339	19,460	1,410	14,694	896	.....	162	962	41,721
TOTALS, AFRICA	$49,339	$40,453	$26,909	9	$35	10,970	$13,654	$2,971	$193,100	$24,859	$18,476	$1,952	$3,921	$2,784	$6,583	$385,036
GRAND TOTALS	$277,576	$235,832	$128,940	37,487	$111,438	1,175,958	$1,009,218	$71,897	$4,220,956	$565,578	$479,148	$181,101	$543,546	$178,402	$729,766	$8,733,398

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORY OF THE UNITED STATES.

	Belting, Hose, and Packing.	Boots and Shoes. Pairs.	Boots and Shoes. Value.	Automobile. Value.	Tires. All Others. Value.	Insulated Wire and Cables. Value.	Druggists' Rubber Sundries. Value.	All Other Manufactures of Rubber. Value.	Totals. Value.
Hawaii	$24,385	.....	.....	$123,133	$22,986	.....	.....	$20,512	$191,016
Porto Rico	3,626	.....	.....	41,484	7,716	.....	.....	8,641	61,467
TOTALS	$28,011	.....	.....	$164,617	$30,702	.....	.....	$29,153	$252,483

(Compiled by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.)

OFFICIAL INDIA RUBBER STATISTICS FOR THE UNITED STATES.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	March. 1919. Pounds.	1919. Value.	1920. Pounds.	1920. Value.
UNMANUFACTURED—*free:*				
India rubber:				
From France	181,784	$50,403	681,507	$216,758
Netherlands	.....	.....	508,979	234,584
Portugal	.....	.....	590,983	153,832
United Kingdom	8,543,628	4,059,734	12,132,921	5,430,923
Canada	3,303,663	1,586,119	10	4
Central America	68,729	22,016	33,633	8,690
Mexico	106,319	47,788	50,918	20,731
Brazil	6,439,808	2,046,296	5,195,613	1,586,260
Peru	1,666,827	556,936	.....	.....
Other South America	218,590	72,110	112,781	36,202
British E. Indies	41,483,959	15,991,931	50,543,518	24,079,584
Dutch E. Indies	2,534,091	1,108,647	11,230,835	4,934,512
Other countries	106,289	42,935	1,395,909	681,081
Totals	64,653,687	$25,584,915	82,477,607	$37,383,161
Balata	39,804	$24,344	61,035	$32,289
Guayule	420,927	107,877	256,300	59,820
Jelutong (Pontianak)	1,678,754	250,871	1,053,230	164,519
Gutta percha	1,009,209	156,902	630,394	106,495
Rubber scrap	378,209	21,234	1,554,686	104,357
Totals, unmanufactured	68,180,590	$26,146,143	86,033,252	$37,850,641
Chicle (dutiable)	849,307	$563,200	1,123,964	$863,822
India rubber and gutta percha	.....	77,362	.....	107,543
India rubber substitute	7,850	1,274	.....	.....

EXPORTS OF DOMESTIC MERCHANDISE.

MANUFACTURED—				
India rubber:				
Scrap and old	261,495	$26,049	1,418,288	$89,108
Reclaimed	279,933	46,136	608,702	98,729
Belting[1]	.....	$75,449	.....	277,576
Hose[1]	.....		.....	235,852
Packing[1]	.....		.....	128,940
Boots[1] ..... *pairs*	18,048	56,836	37,487	111,438
Shoes[1] ..... *pairs*	560,948	377,621	1,175,958	1,009,218
Soles and heels[1]	.....	.....	.....	71,897
Tires:				
For automobiles[1]	.....	1,891,220	.....	.....
Casings[1]	.....		.....	4,220,956
Inner tubes[1]	.....		.....	565,578
Solid tires[1]	.....		.....	479,578
All other tires[1]	.....	112,441	.....	181,101
Druggists' rubber sundries[1]	.....	99,646	.....	178,402
Suspenders and garters	.....	278,271	.....	323,881
Other rubber manufactures[1]	.....	681,909	.....	729,766
Totals, manufactured	.....	$4,145,578	.....	$8,701,570
Fountain pens....*number*	17,519	$21,591	26,411	$31,346
Chewing gum	.....	141,180	.....	357,783
Insulated wire and cables[1]	.....	1,025,867	.....	543,546

EXPORTS OF FOREIGN MERCHANDISE.

UNMANUFACTURED—				
India rubber	450,067	$192,991	584,505	$231,013
Balata	28,000	18,417	83,390	46,976
Jelutong (Pontianak)	.....	.....	28,750	5,562
Rubber scrap	.....	.....	49,693	9,690
Totals, unmanufactured	.....	$211,408	.....	$293,241
MANUFACTURED—				
Gutta percha	.....	$234	.....	$1,527
Totals manufactured	.....	$234	.....	$1,527
India rubber substitute	.....	.....	3,059	$1,407
Chicle	10	12	41,498	21,299

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES.

MANUFACTURED—				
To Alaska:				
Belting, hose and packing	.....	$9,319	.....	$12,542
Boots and shoes..*pairs*	9,400	29,606	8,059	30,813
Other rubber goods	.....	5,693	.....	4,266
Totals	9,400	$44,618	8,059	$47,621
To Hawaii:				
Belting, hose and packing	.....	$17,741	.....	$24,385
Automobile tires	.....	149,812	.....	123,133
Other tires	.....	7,429	.....	22,986
Other rubber goods	.....	11,728	.....	20,512
Totals	.....	$186,710	.....	$191,016
To Porto Rico:				
Belting, hose, and packing	.....	$6,915	.....	$3,626
Automobile tires	.....	97,971	.....	41,484
Other tires	.....	2,001	.....	7,716
Other rubber goods	.....	35,016	.....	8,641
Totals	.....	$141,903	.....	$61,467

To Philippine Islands—treated as foreign commerce.

[1] Details of exports of domestic merchandise by countries during March are given on pages 624-625 of this issue.

OFFICIAL INDIA RUBBER STATISTICS FOR THE UNITED STATES.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

February.

UNMANUFACTURED—*free:*	1919. Pounds.	1919. Value.	1920. Pounds.	1920. Value.
India rubber:				
From France	.....	.....	827,307	$243,229
Netherlands	.....	.....	2,586,622	1,123,583
Portugal	.....	.....	220,462	44,000
United Kingdom	1,093,777	$424,470	15,639,792	7,431,553
Canada	899,995	456,638	9,820	4,630
Central America	37,245	12,950	7,312	2,336
Mexico	222,086	57,766	125,716	50,065
Brazil	5,937,411	1,870,353	3,807,367	1,177,767
Peru	1,171,859	391,455	1,722,297	557,203
Other South America	205,452	76,746	519,485	155,812
British E. Indies	19,560,732	7,224,396	42,982,996	18,823,383
Dutch E. Indies	3,761,983	1,295,391	2,429,197	874,662
Other countries	615,677	249,189	476,531	158,312
Totals	33,506,217	$12,059,354	71,354,904	$30,646,535
Balata	366,859	114,870	328,325	184,304
Guayule	221,648	52,620	40,020	12,006
Jelutong (Pontianak)	398,774	31,626	1,292,316	156,414
Gutta percha	.....	.....	252,215	52,629
Rubber scrap	379,396	22,438	1,327,957	92,215
Totals	1,366,677	$221,554	3,240,833	$497,568
Totals, unmanufactured	34,872,894	12,280,908	74,595,737	31,144,103
Chicle (dutiable)	1,684,612	1,120,336	744,925	596,143
MANUFACTURED—*dutiable:*				
India rubber and gutta percha	.....	$49,275	.....	$58,070
India rubber substitutes	269	29	$1,200	8,842

EXPORTS OF DOMESTIC MERCHANDISE.

MANUFACTURED—				
India rubber:				
Scrap and old	358,185	$32,765	1,446,414	$100,129
Reclaimed	594,749	88,133	409,642	67,451
Belting[1]	.....	455,136	.....	170,299
Hose[1]	.....		.....	272,348
Packing[1]	.....		.....	105,047
Boots[1]	12,138	36,710	39,933	139,224
Shoes[1]	190,961	156,142	1,019,959	866,483
Soles and heels[1]	.....	.....	.....	64,848
Tires:				
For automobiles[1]	.....	1,941,012	.....	.....
Casings[1]	.....		.....	3,849,706
Inner tubes[1]	.....		.....	214,311
Solid tires[1]	.....		.....	213,952
All other tires[1]	.....	65,209	.....	58,067
Druggists' rubber sundries[1]	.....	84,206	.....	121,400
Suspenders and garters	.....	165,320	.....	283,267
Other rubber manufactures[1]	.....	876,831	.....	610,247
Totals, manufactured	1,156,033	$3,901,464	2,915,948	$7,136,779
Fountain pens....*number*	32,508	31,647	20,458	17,022
Chewing gum	.....	129,901	.....	.....
Insulated wire and cables[1]	.....	710,830	.....	567,036

EXPORTS OF FOREIGN MERCHANDISE.

UNMANUFACTURED—				
India rubber	303,659	$147,457	144,575	$60,270
Balata	32,000	19,585	86,830	32,999
Gutta percha	10,205	2,179	120	330
Jelutong (Pontianak)	422	80	60,454	13,015
Rubber scrap	.....	.....	3,099	300
Totals, unmanufactured	346,286	$169,301	295,078	$106,914
MANUFACTURED—				
Gutta percha	.....	$14	.....	1,034
Totals, manufactured	.....	$14	.....	$1,034
India rubber substitutes	.....	.....	14,590	10,588
Chicle	62,719	35,867	.....	.....

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORY OF THE UNITED STATES.

MANUFACTURED—				
To Alaska:				
Belting, hose and packing	.....	$9,854	.....	$5,461
Boots and shoes..*pairs*	3,066	5,004	3,154	9,611
Other rubber goods	.....	628	.....	5,345
Totals	3,066	$15,486	3,154	$20,417
To Hawaii:				
Belting, hose and packing	.....	8,826	.....	7,031
Automobile tires	.....	91,789	.....	44,259
Other tires	.....	731	.....	502
Other rubber goods	.....	10,615	.....	4,902
Totals	.....	$111,961	.....	$56,694
To Porto Rico:				
Belting, hose and packing	.....	$2,799	.....	$9,080
Automobile tires	.....	66,567	.....	47,318
Other tires	.....	1,124	.....	7,539
Other rubber goods	.....	8,169	.....	21,388
Totals	.....	$78,659	.....	$85,325

To Philippine Islands—treated as foreign commerce.

[1]Details of exports of domestic merchandise by countries during February were given on pages 548-549 of THE INDIA RUBBER WORLD, May 1, 1920.

RUBBER STATISTICS FOR THE DOMINION OF CANADA.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

February.

UNMANUFACTURED—*free:*	1919. Pounds.	1919. Value.	1920. Pounds.	1920. Value.
Rubber, gutta percha, etc.:				
From United Kingdom	2,219	$1,168	1,536,109	$897,511
United States	207,705	81,646	616,546	324,054
Brazil	81,646	116,480	.....	.....
British East Indies:				
Ceylon	164,187	88,978	224,000	123,703
Straits Settlements	997,881	363,643	1,041,692	484,290
Dutch East Indies	69,703	14,851	114	57
Other countries	30,232	9,824	72,297	31,003
Totals	1,553,573	$676,590	3,490,758	$1,860,618
Rubber, recovered	181,281	35,134	422,442	75,010
Rubber scrap	467,989	48,254	67,511	5,634
Balata	7	10	.....	.....
Totals unmanufactured	2,202,850	$759,988	3,980,711	$1,941,262
PARTLY MANUFACTURED:				
Hard rubber sheets and rods	2,109	$1,911	5,419	$3,307
Hard rubber tubes	.....	2,480	.....	1,845
Rubber thread, not covered	2,334	3,474	5,382	7,950
Totals partly manufactured	4,443	$7,865	10,801	$13,102
MANUFACTURED—				
Belting	.....	$9,382	.....	$12,633
Hose	.....	11,052	.....	7,718
Packing	.....	6,704	.....	6,496
Boots and shoes	.....	13,098	.....	31,992
Clothing, including waterproofed	.....	23,965	.....	30,977
Gloves	.....	.....	.....	754
Hot water bottles	.....	*	.....	495
Mats and matting	.....	2,184	.....	281
Tires, solid	.....	53,998	.....	7,237
Tires, pneumatic	.....		.....	412,765
Tires, inner tubes	.....		.....	40,050
Tires, other kinds	.....		.....	.....
Other manufactures	.....	160,535	.....	197,816
Totals, manufactured	.....	$280,918	.....	$749,214
Totals, rubber imports	.....	$1,048,671	.....	$2,703,578
Insulated wire and cables: Wire and cables, covered with cotton, linen, silk, rubber, etc	.....	$14,968	.....	$10,761
Copper wire and cables, covered as above	†	.....	.....	18,469
Rubber substitutes	$185,404	18,946	$158,505	20,021
Chicle	41,841	28,299	137,455	114,918

*Included with "Manufactures of india rubber," etc.
†Included in "Wire and Cables."

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS.

February.

UNMANUFACTURED.	1919. Produce of Canada. Value.	1919. Reexports of Foreign Goods. Value.	1920. Produce of Canada. Value.	1920. Reexports or Foreign Goods. Value.
Crude and waste rubber	$41,319	.....	$41,184	$25
MANUFACTURED:				
Belting	$765	.....	$1,354	.....
Hose	8,216	.....	12,993	.....
Boots and shoes	115,874	$274	93,079	126
Clothing, including waterproofed	1,842	.....	616	9
Tires, pneumatic	.....	4,379	822,316	3,354
Tires, other kinds	634,284		626	
Other manufactures	68,108	333,480	17,238	1,850
Totals, manufactured	$829,089	$338,133	$948,408	$5,339
Totals, rubber exports	$870,408	$338,133	$989,406	$5,364
Insulated wire and cable	.....	.....	438	.....
Chicle	71,450	.....	33,934	.....

RUBBER STATISTICS FOR ITALY.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

Eleven Months Ended November 30, 1919.

	1918. Quintals.[1]	1918. Lire.[2]	1919. Quintals.	1919. Lire.
UNMANUFACTURED—				
Crude rubber and gutta percha—raw and reclaimed:				
From Great Britain	7,155		132	
British India and Ceylon	7,011		24,652	
Straits Settlements	28,652		43,996	
French African Colonies	6,496	65,757,650	3,977	107,752,050
Belgian Congo	251		1,033	
Brazil	17,419		27,344	
Other countries	2,309		1,576	
Totals	69,293	65,757,650	102,710	107,752,050
Rubber scrap	2,379	428,220	14,700	2,646,000
Totals, unmanufactured	71,672	66,185,870	117,410	110,398,050
MANUFACTURED—				
India rubber and gutta percha—Threads	599	1,577,400	207	538,200
Sheets, including hard rubber	300	481,800	121	201,400
Tubes	111	63,700	218	293,600
Belting	512	716,800	561	785,400
Rubber-coated fabrics—*pieces*	250	385,600	435	539,200
Boots and shoes—*pairs*	31,510	472,650	52,235	783,525
Elastic webbing	194	543,200	292	550,000
Clothing and articles for travel	15	48,000	9	28,800
Tires and tubes:				
From France	2,408		3,987	
Great Britain	446	6,852,150	1,214	12,892,800
Other countries	1		171	
Other manufactures	6,993	10,816,300	13,894	21,685,700
Totals, manufactured	.....	21,957,600	.....	38,298,625
Total imports	.....	88,143,470	.....	148,696,675

EXPORTS OF CRUDE AND MANUFACTURED RUBBER.

UNMANUFACTURED—				
India rubber and gutta percha—raw and reclaimed:				
To Spain	1,394		2,140	
United States	1,134	1,011,200	2,078	1,687,600
Other countries	.....		1	
Totals	2,528	1,011,200	4,219	1,687,600
Ruber scrap	.....	.....	4,201	504,120
Totals, unmanufactured	2,528	1,011,200	8,420	2,191,720
MANUFACTURED—				
India rubber and gutta percha—Threads	76	205,200	480	1,296,000
Sheets, including hard rubber	88	141,600	87	158,400
Tubes	366	452,200	791	1,036,100
Belting	87	139,200	95	152,000
Rubber-coated fabrics—*pieces*	46	55,200	255	306,000
Boots and shoes—*pairs*	.....	.....	6,064	90,960
Elastic webbing	1,024	3,072,000	808	2,424,000
Clothing and articles for travel	8	38,400	42	201,600
Tires:				
To France	2,939		1,041	
Great Britain	2,001		6,254	
Spain	82		610	
Switzerland	2		1,779	
British India and Ceylon	579		944	
Dutch East Indies	607	15,086,000	344	36,107,600
Straits Settlements	235		198	
Australia	95		507	
Argentina	221		1,531	
Brazil	529		1,055	
Other countries	650		4,741	
Totals, tires	7,949	15,086,000	19,004	36,107,600
Other rubber manufactures:	1,187	1,774,800	3,958	5,753,400
Totals, manufactured	.....	20,963,600	.....	47,526,060
Total exports	.....	21,975,800	.....	49,717,780

[1] One quintal equals 220.46 pounds.
[2] One lira equals $0.193.

RUBBER STATISTICS FOR ITALY.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

Twelve months ended December 31.

	1918. Quintals.[1]	1918. Lire.[2]	1919. Quintals.	1919. Lire.
UNMANUFACTURED—				
India rubber and gutta percha—raw and reclaimed:				
From Great Britain	7,155		132	
British India and Ceylon	7,980		25,579	
Straits Settlements	31,130		44,624	
French African Colonies	6,601	79,227,750	3,977	110,549,250
Belgian Congo	251		1,033	
Brazil	19,925		27,712	
Other countries	2,413		2,228	
Totals	75,455	79,227,750	105,285	110,549,250
Rubber scrap	2,945	530,100	15,083	2,714,940
Totals unmanufactured	78,400	79,757,850	120,368	113,264,190
MANUFACTURED—				
India rubber and gutta percha—				
Threads	671	1,744,600	295	767,000
Sheets, including hard rubber	343	551,500	153	257,700
Tubes	112	150,600	228	308,000
Belting	607	849,800	603	844,200
Rubber-coated fabrics	393	622,700	531	837,300
Boots and shoes—*pairs*	32,443	486,645	90,393	1,358,895
Elastic webbing	332	929,600	363	1,016,400
Clothing and articles for travel	17	54,400	28	89,600
Tires:				
From France	2,554		4,314	
Great Britain	468	7,260,000	1,722	15,062,400
Other countries	3		240	
Other rubber manufactures	7,901	12,207,800	15,388	24,001,900
Totals, manufactured	.....	24,857,645	.....	44,543,395
Total imports	.....	104,615,495	.....	157,807,585

EXPORTS OF CRUDE AND MANUFACTURED RUBBER.

UNMANUFACTURED—				
India rubber and gutta percha—raw and reclaimed:				
To Spain	1,778		2,155	
United States	1,134	1,164,800	2,605	1,904,400
Other countries	.....		1	
Totals	2,912	1,164,800	4,761	1,904,400
Rubber scrap	.....	.....	4,842	581,040
Totals, unmanufactured	2,912	1,164,800	9,603	2,485,440
MANUFACTURED—				
India rubber and gutta percha—Threads	82	221,400	503	1,358,100
Sheets, including hard rubber	92	146,700	89	161,500
Tubes	401	491,700	906	1,111,300
Belting	87	139,200	95	152,000
Rubber fabrics—*pieces*	55	66,000	293	351,600
Boots and shoes—*pairs*	.....	.....	6,364	95,460
Elastic webbing	1,205	3,615,000	1,005	3,015,000
Clothing and articles of travel	10	48,000	167	801,600
Tires:				
To France	2,947		1,160	
Great Britain	2,001		8,843	
Spain	84		696	
Switzerland	2		1,845	
British India and Ceylon	579		1,410	
Dutch East Indies	774	15,828,900	417	44,593,000
Straits Settlements	235		271	
Australia	158		508	
Argentina	221		1,532	
Brazil	529		1,057	
Other countries	801		5,731	
Other rubber manufactures	1,239	1,853,200	4,604	6,676,000
Totals, manufactured	.....	22,410,100	.....	58,315,560
Total exports	.....	23,574,900	.....	60,801,000

[1] One quintal equals 220.46 pounds.
[2] One lira equals $0.193.

UNITED KINGDOM RUBBER STATISTICS.

IMPORTS.

March.

	1919. Pounds.	1919. Value.	1920. Pounds.	1920. Value.
UNMANUFACTURED—				
Crude rubber:				
From—				
Dutch East Indies	142,600	£16,040	67,400	£7,836
French West Africa	.....	.....	52,600	4,380
Gold Coast	27,300	3,696	47,400	5,766
Other African countries	400,700	39,240	97,500	9,721
East Africa (including Madagascar)	108,500	11,094	72,400	8,635
Peru	33,100	4,323	12,600	1,395
Brazil	2,237,200	240,898	3,492,400	418,040
British India	2,235,200	249,941	1,345,500	167,229
Straits Settlements	7,365,000	792,931	4,765,800	596,000
Federated Malay States	4,538,300	530,116	5,586,300	688,412
Ceylon and dependencies	3,479,400	386,724	3,943,200	461,460
Other Dutch possessions in Indian Seas	1,401,500	154,622	708,400	85,934
Other countries in East Indies and Pacific, not elsewhere specified	414,900	50,163	186,400	23,439
South and Central America (except Brazil and Peru)	1,400	115	11,200	1,200
Other countries	2,500	889	241,000	18,428
Totals	22,387,600	£2,480,792	20,630,100	£2,497,875
Waste and reclaimed rubber	80,400	2,140	536,900	13,174
Totals, unmanufactured	22,468,000	£2,482,932	21,167,000	£2,511,049
Gutta percha and balata	997,200	201,792	657,500	115,982
*Rubber substitute	.....	.....	166,200	7,210

*Included in "Other Articles," Class III., T., prior to 1920.

MANUFACTURED—				
Boots and shoes—*dozen pairs*	3,538	£5,495	30,484	£82,076
Waterproofed clothing	.....	893	.....	3,156
Tires and tubes	.....	88,642	.....	351,724
Other rubber manufactures	.....	47,214	.....	55.321
Insulated wire	.....	2,472	.....	666
Submarine cables	.....	.....	.....	50
Totals	.....	£144,716	.....	£492,993

UNITED KINGDOM RUBBER STATISTICS—(Continued)

EXPORTS.

	March 1. 1919.		1920.	
UNMANUFACTURED—				
Waste and reclaimed rubber..	790,700	£20,634	1,309,900	£27,497
†Rubber substitutes	.....	.....	504,800	32,180
Totals	.....	.....	1,814,700	£59,677
MANUFACTURED—				
Waterproofed clothing	.....	£86,262	.....	£256,145
Boots and shoes..*dozen pairs*	6,187	11,631	7,661	16,685
Tires and tubes.	.....	344,714	.....	590,002
Other rubber manufactures...	.....	262,547	.....	486,516
Insulated wire	.....	32,757	.....	130,499
Submarine cables	.....	47,496	.....	303,406
Totals	.....	£802,041	.....	£1,842,930

†Included in "Other Articles," Class III, T., prior to 1920.

EXPORTS—COLONIAL AND FOREIGN.

UNMANUFACTURED—				
Crude rubber:				
To Sweden, Norway and Denmark	94,700	£11,793	141,900	£17,347
Germany	.....	.....	619,100	75,530
Belgium	120,100	12,181	560,800	68,517
France	3,914,800	404,123	4,408,600	576,609
Spain	163,900	16,608	11,200	1,631
Italy	1,202,000	136,233	1,045,900	130,004
Austria-Hungary	.....	.....	22,400	3,555
Other European countries	.....	.....	17,900	2,401
United States	8,585,000	878,446	12,286,000	1,630,407
Canada	53,700	6,005	666,500	90,317
Other countries	133,700	16,893	135,300	17,612
Totals, rubber 14,267,900		£1,482,282	19,915,600	£2,613,930
Waste and reclaimed.....	2,100	90	1,000	37
Gutta percha and balata.....	78,300	13,613	181,800	35,351
Totals, unmanufactured.	80,400	£13,703	183,800	£35,388
MANUFACTURED—				
Boots and shoes..*dozen pairs*	100	13	6,000	245
Waterproofed clothing	.....	248	.....	.....
Tires and tubes	.....	14,210	.....	17,362
Insulated wire	.....	139	.....	.....
Other manufactures	.....	3,509	.....	5,002
Totals, manufactured....	.....	£18,119	.....	£22,609

THE MARKET FOR RUBBER SCRAP.

NEW YORK.

THE RUBBER SCRAP SITUATION has gone from bad to worse for the past several months. Both domestic and export business have well-nigh ceased.

The reclaimers have not been in the market owing to the curtailment of their manufacturing operations due to strikes and difficulties of shipment, such as car shortage and freight embargoes.

The downward trend of the crude rubber market has been steadily approaching the low record and has seriously impaired both rubber scrap and reclaimed rubber values which move in close sympathy with crude.

Export trade in rubber scrap has been eliminated by reason of a succession of harbor strikes affecting cartage and loading facilities.

Shoes can be purchased from 7⅜ to 7½ cents and standard auto tires from 3¼ to 3½ cents, delivered at mill. The following prices are practically nominal:

QUOTATIONS FOR CARLOAD LOTS DELIVERED.

MAY 25, 1920.

Prices subject to change without notice.

BOOTS AND SHOES:			
Arctic tops	*lb.*	$0.01 @	
Boots and shoes	*lb.*	.07⅛ @	.07½
Trimmed arctics	*lb.*	.05½ @	.06¼
Untrimmed arctics	*lb.*	.05¼ @	.06¼
HARD RUBBER:			
Battery jars, black compound	*lb.*	.01 @	
No. 1, bright fracture	*lb.*	.23 @	.24
INNER TUBES:			
No. 1	*lb.*	.16 @	
Compounded	*lb.*	.09⅞ @	.10
Red	*lb.*	.08¼ @	
MECHANICALS:			
Black scrap, mixed, No. 1	*lb.*	.03½ @	.04
No. 2	*lb.*	.03 @	
Car springs	*lb.*	.03½ @	.04
Heels	*lb.*	.03 @	.03½
Horse-shoe pads	*lb.*	.03 @	.03½
Hose, air brake	*lb.*	.04¼ @	
fire, cotton lined	*lb.*	.01½ @	.01¾
garden	*lb.*	.01½ @	.01¾
Insulated wire stripping, free from fiber	*lb.*	.03½ @	.04
Matting	*lb.*	.01¼ @	.01½
Red packing	*lb.*	.05½ @	.06
Red scrap, No. 1	*lb.*	.09 @	.10
No. 2	*lb.*	.06¾ @	.07¼
White scrap No. 2	*lb.*	.08 @	.09
No. 1	*lb.*	.10 @	.11
TIRES:			
PNEUMATIC—			
Auto peelings	*lb.*	.04½ @	.05
Bicycle	*lb.*	.02¾ @	.03
Standard white auto	*lb.*	.04⅝ @	.04¾
Standard auto	*lb.*	.03¼ @	.03½
Stripped, unguaranteed	*lb.*	.02½ @	.02¾
White, G. & G., M. & W., and U. S.	*lb.*	.04¾ @	.05
SOLID—			
Carriage	*lb.*	.04 @	.04¼
Irony	*lb.*	.01 @	
Truck	*lb.*	.03½ @	.03¾

THE MARKET FOR COTTON AND OTHER FABRICS.

NEW YORK.

AMERICAN COTTON. Until the latter part of May, when there was some lively speculation, the market continued steady, prices shifting a few points from day to day arcund 41.30 cents. April 29 middling upland cotton was 41.35 cents, on May 17 it was 41.60 cents, the lowest point reached in the interval being 41.10 and the highest 41.75. It then shot up, reaching 43 cents on May 20 and 21 and dropping again rapidly to 41 cents on May 22 and 40 cents on May 24, the lowest price reached since March 1; no record of sales on any day of the month.

Planting has been delayed by the weather, rain prevailing in many parts of the South, with a long drought in Texas. It is hampered also by the insufficiency of labor. Yet with late planting a good crop is still possible and no serious shortage is looked for at present. No marked reduction in prices is anticipated for a long time, even if the plan to develop cotton in the British possessions is carried out in earnest, for the supply is not likely to satisfy all the needs.

EGYPTIAN COTTON. After a dull market in Alexandria until the middle of May prices fell rapidly at the end of the third week. English mills would not pay the high prices asked and the American demand fell off, owing in a great degree to the traffic congestion of the railroads. This has compelled automobile manufacturers to suspend construction and lay off their men in some cases, because steel and other materials could not be transported. Consequently the rubber firms cut down production, and the tire builders' pressing need for long staple cotton was eased off. For the new crop, which is late, all the cotton area has been planted, according to some reports, while others say that a part of it has been planted with cereals by government orders. Recent cable advices from Alexandria state that the condition of the growing crop is favorable but the weather has been cool. It is reported that there is about 15 per cent increase in acreage over last season.

Good grade Sakel is worth $1.35 old crop, $1.15 new crop. Good grade uppers can be bought for $0.90 old crop, $1.05 new crop.

ARIZONA COTTON. Every foot of land available for cotton growing, it is understood, has already been planted, for the growers have last year's experience and profits in mind and know that the Arizona cotton must make up for the loss of Sea Island. The crop has now been practically all sold although there may be 100 to 200 bales still in first hands. This cotton is worth nominally $1.25. The present season will show a large increase in acreage and with seasonable weather a crop of about 90,000 bales should be raised.

SEA ISLAND COTTON. For practical purposes the crop must be

given up for the present, the boll weevil is spreading into all the Southern cotton fields. Exertions are being made in the West Indies to raise the long staple cotton; even if wholly successful the total production will be inadequate.

COTTON FABRICS. There is no change in the prices of tire fabrics as the spinning and the fabric mills are sold up for the rest of the year. The expectation is that cotton prices will ease off and that it is better to see how the crops promise before buying. Yarn prices are unaltered. The demand for future deliveries in ducks and drills is not so strong as it has been, owing in part to the railroad situation, but the immediate supply is still insufficient. In raincoat fabrics there is little demand as buyers are waiting for the lower prices that are hoped for this summer. The market for sheetings shows signs of weakening here and there but the mills hold firm. Business is very quiet, what buying there is being for rubber concerns and automobile fabric manufacturers.

NEW YORK QUOTATIONS.

MAY 25, 1920.

Prices subject to change without notice.

ASBESTOS CLOTH:			
Brake lining, 2½ lbs. sq. yd., brass or copper insertion *lb.*	$1.00	@	1.10
2¾ lbs. sq. yd., brass or copper insertion *lb.*	1.10	@	1.15
BURLAPS:			
32—7-ounce 100 *yards*		@	
32—8-ounce		@	
40—7½-ounce	9.00	@	
40—8-ounce	9.25	@	
40—10-ounce	12.00	@	
40—10½ ounce	12.25	@	
45—7½-ounce		@	
45—8-ounce		@	
48—10-ounce		@	
DRILLS:			
38-inch 2.00-yard *yard*	.47½	@	
40-inch 2.47-yard	.39¼	@	
52-inch 1.90-yard	.60½	@	
52-inch 1.95-yard	.59¼	@	
60-inch 1.52-yard	.86	@	
DUCK:			
CARRIAGE CLOTH:			
38-inch 2.00-yard enameling duck *yard*	.48	@	
38-inch 1.74-yard	.56¼	@	
72-inch 16.66-ounce	1.30	@	
72-inch 17.21-ounce	1.40	@	
MECHANICAL:			
Hose *pound*	.82	@	
Belting	.82	@	
HOLLANDS, 40-INCH:			
Acme *yard*		@	
Endurance		@	
Penn		@	
OSNABURGS:			
40-inch 2.35-yard *yard*	*.35	@	
40-inch 2.48-yard	*.33⅛	@	
37½-inch 2.42-yard	*.34	@	
RAINCOAT FABRICS:			
COTTON:			
Bombazine 64 x 60 *yard*	.30	@	
60 x 48	.27	@	
Cashmeres, cotton and wool, 36-inch, tan	1.10	@	
Twills 64 x 72	.46	@	
64 x 102	.48	@	
Twill, mercerized, 36-inch, blue and black	.62½	@	
tan and olive	.60	@	
Tweed	.80	@	1.40
printed	.27½	@	
Plaids 60 x 48	.28	@	
56 x 44	.27	@	
Repp	.40	@	.45
Prints 60 x 48	.29	@	
64 x 60	.32	@	
IMPORTED WOOLEN FABRICS SPECIALLY PREPARED FOR RUBBERIZING—PLAIN AND FANCIES:			
63-inch, 3¼ to 7½ ounces *yard*	1.45	@	3.90
36-inch, 2¼ to 5 ounces	.85	@	2.25
IMPORTED PLAID LINING (UNION AND COTTON:)			
63-inch, 2 to 4 ounces *yard*	.95	@	1.90
36-inch, 2 to 4 ounces	.60	@	1.15
DOMESTIC WORSTED FABRICS:			
36-inch, 4½ to 8 ounces *yard*	$0.85	@	1.90
DOMESTIC WOVEN AND PLAID LININGS (COTTON):			
36-inch, 3¾ to 5 ounces	.27	@	.35
SHEETINGS, 40-INCH:			
48 x 48, 2.35-yard *yard*	.36¼	@	
48 x 48, 2.50-yard	.34	@	
48 x 48, 2.70-yard		@	
48 x 48, 2.85-yard	.31	@	
64 x 68, 3.15-yard	.34½	@	
56 x 60, 3.60-yard	.29	@	
48 x 44, 3.75-yard	.27	@	
SILKS:			
Canton, 38-inch *yard*	.70	@	
Schappe, 36-inch	1.00	@	
STOCKINETTES:			
SINGLE THREAD:			
3½ Peeler, carded *pound*		@	
4½ Peeler, carded	1.15	@	1.15¼
6½ Peeler, combed	1.80	@	
DOUBLE THREAD:			
Zero Peeler, carded *pound*	.98	@	.98½
3½ Peeler, carded	1.04	@	1.04½
6½ Peeler, combed	2.70¼	@	2.70½
TIRE FABRICS:			
BUILDING:			
17¼-ounce Sakellarides, combed *pound*	2.70	@	3.00
17¼-ounce Egyptian, combed	2.50	@	2.65
17¼-ounce Egyptian, carded	2.40	@	2.55
17¼-ounce Peelers, combed	2.40	@	2.55
17¼-ounce Peelers, carded	1.55	@	1.70
CORD:			
15-ounce Egyptian *pound*	2.75	@	2.90
BICYCLE:			
8-ounce American *pound*	1.60	@	1.80
10-ounce American	1.50	@	1.80

TIRE
FABRICS

JENCKES
SPINNING
COMPANY

PAWTUCKET
RHODE ISLAND

AKRON OFFICE
407 Peoples Savings & Trust
Co. Building.

CHAFER:			
9¼-ounce Sea Island	*pound*	2.70	@
9¼-ounce Egyptian, carded		2.50	@
9¼-ounce Peeler, carded		1.80	@

*Nominal.

EGYPTIAN COTTON CROP MOVEMENT.

FROM AUGUST 1, 1919, TO APRIL 14, 1920.

	1919-1920.	1918-1919.	1917-1918.
To Liverpool *bales*	240,537	183,229	155,656
Manchester	138,809	91,087	91,597
Other United Kingdom ports	145	5,537	115,784
Total shipments to Great Britain	379,491	279,853	363,037
To France	45,020	46,602	20,711
Spain	8,390	10,290	4,684
Italy	24,262	32,207	22,651
Belgium	630	.....	.....
Switzerland	11,906	20,379	3,350
Holland	666	.....	.....
Portugal	590	.....	.....
Germany	2,167	.....	.....
Austria	10,089	.....	.....
Greece	104	3,963	550
Turkey and other countries	98	.....	.....
Total shipments to Continent	103,922	113,441	51,946
To United States	271,239	45,954	38,763
Japan	15,911	11,517	12,464
Total shipments to all parts	770,563	450,765	466,210
Total crop (interior gross weight), cantars[1]	.....	4,826,342	6,315,841

[1]One cantar equals 98 pounds.
(Compiled by Davies, Benachi & Co.)

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS.

NEW YORK.

DEMAND for chemicals and compounding ingredients of all kinds naturally diminished during the railroad strike, but the relative scarcity of supplies has been still greater in most lines. Prices in general have remained firm with a tendency to advance. The fact that most large manufacturers of rubber goods have been obliged to curtail operations by 50 per cent has had a marked influence on the demand for supplies.

ANILINE. About the middle of the month the price advanced to 37 cents per pound, but later fell to 34 cents owing to increased supply and reduced demand.

BARYTES. There is practically no spot stock and lack of facilities to deliver has created a very difficult situation for producers as well as consumers.

BENZOL. The supply remains very limited and prices firm.

BLACKS. Prices still remain very high. The demand from the rubber industry has notably slackened temporarily due to reduced tire manufacturing output.

CARBON BISULPHIDE. Spot stocks continue to remain low and the price has advanced to 7½ cents per pound.

CARBON TETRACHLORIDE. The demand during the past month has not been excessive. Spot price remains steady at 13 cents per pound.

DRY COLORS. The leading feature has been the persistent scarcity of supplies for dry color manufacture, which has rendered these products very difficult to secure in volume sufficient to satisfy the demand.

LITHARGE. Prices have held firm notwithstanding a lessened demand by users. Deliveries have been impeded seriously by the railroad strike situation.

LITHOPONE. The demand remains practically double the capacity of production. There has been no change in prices.

SUBLIMED LEAD. The demand has been lessened by the strikes, although it remains in excess of productive capacity. There will be no change in prices until general revision of the lead schedule takes place.

SULPHUR. Prices and demand continue steady.

WHITING. Supplies of English chalk remain at low level, although an increase is expected soon. The output of whiting is also lessened by the shortage of labor for its manufacture.

ZINC OXIDE. Production is said to be increasing and higher prices are possible since there is no slackening of the demand from users.

NEW YORK QUOTATIONS.

MAY 25, 1920.

Prices subject to change without notice.

ACCELERATORS, ORGANIC.			
Accelerene, New York *lb.*	$4.75	@	
Accelemal *lb.*	.55	@	.57½
Aldehyde ammonia crystals *lb.*	2.25	@	2.50
Aniline oil *lb.*	.35	@	
Excellerex *lb.*	.65	@	.75
Hexamethylene tetramine (powdered) *lb.*	2.50	@	3.50
N. C. C. *lb.*	.50	@	
No. 999 *lb.*	.22	@	
Paraphenylenediamine *lb.*	2.70	@	2.85
Thiocarbanilide *lb.*	.55	@	.70
Velosan *lb.*	3.70	@	3.85
ACCELERATORS, INORGANIC.			
Lead, dry red (bbls.) *lb.*	.12¼	@	
sublimed blue (bbls.) *lb.*	.10	@	
sublimed white (bbls.) *lb.*	.10	@	
white, basic carbonate (bbls.) *lb.*	.10½	@	
Lime, flour *lb.*	.02	@	
Litharge, domestic *lb.*	.11¼	@	.12¼
sublimed *lb.*	.12	@	
imported *lb.*	.15	@	
Magnesium, carbonate, light technical *lb.*	.11½	@	.14
calcined extra light *lb.*	.60	@	
calcined light *lb.*	.35	@	
calcined medium light *lb.*	.30	@	
calcined heavy *lb.*	.07½	@	.08
calcined commercial (magnesite) *lb.*	.04	@	0.05
Magnesium oxide, extra light *lb.*	.65	@	
ACIDS.			
Acetic, 28 per cent (bbls.) *cwt.*	3.75	@	4.50
glacial, 99 per cent (carboys) *cwt.*	15.95	@	16.70
Cresylic (97% straw color) (drums) *gal.*	1.20	@	1.30
(95% dark) (drums) *gal.*	1.10	@	1.20
Muriatic, 20 degrees *cwt.*	2.25	@	2.50
Nitric, 36 degrees *cwt.*	6.00	@	6.50
Sulphuric, 66 degrees *ton*	24.00	@	25.00
ALKALIES.			
Caustic soda, 76 per cent (bbls.) *lb.*	.07	@	.08
Soda ash (bbls.) *lb.*	.04½	@	
COLORS.			
Black:			
Bone, powdered *lb.*	.06	@	
granulated *lb.*	.11	@	
Carbon black (sacks, factory) *lb.*	.15	@	.30
Drop *lb.*	.05¼	@	.15
Ivory black *lb.*	.16	@	.30
Lampblack *lb.*	.15	@	.45
Oil soluble aniline *lb.*	1.25	@	
Rubber black *lb.*	.09½	@	
Blue:			
Cobalt *lb.*	.27	@	.35
Prussian *lb.*	1.00	@	
Ultramarine *lb.*	.15	@	.50
Rubber makers' blue *lb.*	3.50	@	
Brown:			
Iron oxide *lb.*	.04¼	@	.06¼
Sienna, Italian, raw and burnt *lb.*	.05¼	@	.14
Umber, Turkey, raw and burnt *lb.*	.06	@	.09
Vandyke *lb.*	.02½	@	.09½
Green:			
Chrome, light *lb.*	.42	@	.70
medium *lb.*	.42	@	.70
dark *lb.*	.50	@	.71
commercial *lb.*	.07	@	.15
Oxide of chromium (casks) *lb.*	1.25	@	
Rubber makers' green *lb.*	3.50	@	
Red:			
Antimony, crimson, sulphuret of (casks) *lb.*	.38	@	.40
crimson, "Mephisto" (casks) *lb.*	.60	@	
crimson, "R. M. P." *lb.*	.65	@	
Antimony, golden sulphuret of (casks) *lb.*	.20	@	.22
golden sulphuret (States) *lb.*	.30	@	.35
golden, "Mephisto" (casks) *lb.*	.33	@	
golden, "R. M. P." *lb.*	.33	@	
red sulphuret (States) *lb.*	.25	@	.30
vermilion sulphuret *lb.*	.55	@	
Arsenic, red sulphide *lb.*	.18	@	
Indian *lb.*	.14	@	.16
Para toner *lb.*	2.25	@	2.50
Red excelsior *lb.*	.19	@	.22
Toluidine toner *lb.*	4.25	@	
Iron oxide, reduced grades *lb.*	.12	@	
pure bright *lb.*	.16	@	
Spanish bright *lb.*	.04¼	@	.05½
Venetian *lb.*	.03¼	@	.07
Oil soluble aniline, red *lb.*	2.00	@	
orange *lb.*	1.75	@	

Oximony	lb.	$0.18	@	
Vermilion, American	lb.	.25	@	.30
artificial	lb.	.37	@	
English quicksilver	lb.	1.65	@	1.75
Rubber makers' red	lb.	3.50	@	4.00
purple	lb.	2.50	@	
White:				
Aluminum bronze, C. P.	lb.	.65	@	
superior	lb.	.69	@	
Lithopone, domestic	lb.	.08	@	.08¼
Ponolith (carloads, factory)	lb.		@	
Rubber-makers' white	lb.	.11¼	@	
Zinc oxide, Horsehead (carload, factory):				
"XX red"	lb.	.10	@	
"Special"	lb.		@	
French process, red seal	lb.	.11¼	@	.11¾
green seal	lb.	.12¼	@	
white seal	lb.	.13½	@	.13¾
(States)	lb.		@	
Azo (carload, factory):				
ZZZ, lead free	lb.	.10	@	.10¼
ZZ, under 5% leaded	lb.	.09	@	.09¼
Z, 8-10% leaded	lb.	.08¼	@	.08½
Yellow:				
Cadmium, sulphide, yellow, light, orange	lb.	1.75	@	2.00
red	lb.	1.85	@	
Chrome, light and medium	lb.	.35	@	
Ochre, domestic	lb.	.04	@	.07
imported	lb.	.06½	@	.08½
Oil, soluble aniline	lb.	2.00	@	
Rubber makers' yellow	lb.	1.50	@	2.50
Zinc chromate	lb.	.45	@	

COMPOUNDING INGREDIENTS.

Aluminum flake (carload)	ton	30.00	@	
silicate	ton	30.00	@	35.00
Ammonia carbonate, powdered	lb.	.17¾	@	
Asbestine (carloads)	ton	23.00	@	
Barium, carbonate, precipitated	ton	87.50	@	90.00
sulphide, precipitated	lb.	.05	@	
dust	ton	100.00	@	
Barytes, pure white (f. o. b. works)	ton	27.50	@	
off color	ton	16.00	@	
uniform floated	ton	27.50	@	
Basofor	lb.	.05½	@	
Blanc fixe	lb.	.05½	@	
Bone ash	lb.	.10	@	
Carrara filler	lb.	.02	@	
Chalk, precipitated, extra light	lb.	.05	@	.05½
heavy	lb.	.04	@	.04½
China clay, Dixie Blue Ridge	ton	20.00	@	
domestic	ton	18.50	@	20.00
imported	ton	18.00	@	23.50
Shawnee	ton	20.00	@	
Cotton linters, clean mill run, f. o. b. factory	lb.	.03½	@	.04
Fossil flour (powdered)	lb.	.03½	@	
(bolted)	lb.	.04	@	
Diatomite	lb.	.03	@	.04
Glue, high grade	lb.	.35	@	.45
medium	lb.	.30	@	.35
low grade	lb.	.20	@	.25
Graphite, flake (400-pound bbl.)	lb.	.10	@	.30
amorphous	lb.	.04	@	.08
Ground glass FF. (bbls.)	lb.	.03	@	
Infusorial earth (powdered)	lb.	.03½	@	
(bolted)	lb.	.04	@	
Liquid rubber	lb.	.18	@	
Mica, powdered	lb.	.15	@	
Pumice stone, powdered (bbl.)	lb.	.05	@	.08
Rotten stone, powdered	lb.	.02½	@	.04½
Rubber paste	lb.	.19	@	.22
Rub-R-Glu	lb.		@	
Silex (silica)	ton	25.00	@	40.00
Soapstone, powdered gray (carload)	ton	25.00	@	
Starch, powdered corn (carload, bbls.)	cwt.	6.09	@	
(carload, bags)	cwt.	5.62	@	
Talc, powdered soapstone	ton	25.00	@	40.00
Terra blanche	ton	22.00	@	32.00
Tripoli earth, air-floated, cream or rose	ton	50.00	@	
white	ton	52.50	@	
Tyre-lith	ton	90.00	@	
Whiting, Alba (carloads)	cwt.	1.00	@	
Columbia	cwt.	.80	@	
commercial	cwt.	1.40	@	
English cliffstone	cwt.	2.00	@	
gilders	cwt.	1.45	@	1.55
Paris, white, American	cwt.	1.75	@	
Quaker	ton	16.00	@	
Super	ton	30.00	@	32.50
Wood pulp, imported	lb.	.03¾	@	
XXX	ton	75.00	@	
X	ton	65.00	@	
Wood flour, American	ton	50.00	@	

MINERAL RUBBER.

Elateron (carloads)	ton	60.00	@	63.00
(Less carloads)	ton			
Gilsonite	lb.	.03¾	@	
Genasco (carloads, factory)	ton	62.50	@	
(less carloads, factory)	ton	64.50	@	
Hard hydrocarbon	ton	35.00	@	
K-X	ton		@	
K. M. R.	ton		@	
M. R. X.	ton	$100.00	@	
Pioneer, carload, factory	ton	55.00	@	
less carload, factory	ton	60.00	@	
Raven M. R.	ton	50.00	@	70.00
Refined Elaterite	ton		@	
Richmond	ton	75.00	@	
No. 64	ton	44.00	@	
318/320 M. P. hydrocarbon	ton	50.00	@	
Robertson, M. R. Special (carloads, factory)	ton	75.00	@	80.00
M. R. (carloads, factory)	ton	57.50	@	
M. R. (less car loads factory)	ton	60.00	@	
Walpole rubber flux (factory)	lb.	.05	@	

OILS.

Avoilas compound	lb.	.16	@	.18
Castor, No. 1, U. S. P.	lb.	.20	@	
No. 3, U. S. P.	lb.	.19	@	
Corn	lb.	.18½	@	
Corn, refined Argo	cwt.	20.06	@	
Cotton	lb.	.19½	@	
Glycerine (98 per cent)	lb.	.23½	@	.24
Linseed, raw (carloads)	gal.	1.67	@	1.72
Linseed compound	gal.	.85	@	
Palmoline	lb.	.16	@	.17
Palm (Lagos)	lb.	.15	@	
Peanut	lb.	.19	@	
Petrolatum	lb.	.10	@	
Petroleum grease	lb.	.07½	@	.09
Pine, steam distilled	gal.	1.75	@	
Rapeseed, refined	lb.	.22	@	
blown	lb.	.22	@	
Rosin	gal.	.70	@	1.05
Soya bean	lb.	.18½	@	
Tar	gal.	.38	@	.40

RESINS AND PITCHES.

Balsam, fir	gal.	1.75	@	1.80
Cantella gum	lb.	.55	@	
Cumar resin, hard	lb.	.12	@	.16
soft	lb.	.09	@	.13
Tar, retort	bbl.	15.50	@	16.50
kiln	bbl.	15.00	@	15.50
Pitch, Burgundy	lb.	.10	@	
coal tar	lb.	.02	@	
pine tar	lb.	.04	@	
ponto	lb.	.14	@	
Rosin	bbl.	16.95	@	21.75
granulated	lb.			None
fused				None
Rosin, K	bbl.	23.50	@	
strained	bbl.	20.00	@	
Shellac, fine orange	lb.	1.15	@	

SOLVENTS.

Acetone (98.99 per cent drums)	lb.	.24½	@	
methyl (drums)	gal.	1.50	@	
Benzol, water white	gal.	.28	@	.33½
Beta-naphthol	lb.	.80	@	.85
Carbon bisulphide (drums)	lb.	$0.07½	@	.08¼
tetrachloride (drums)	lb.	.12	@	.14
Naphtha, motor gasoline (steel bbls.)	gal.	.30	@	
73 @ 76 degrees (steel bbls.)	gal.	.40	@	
70 @ 72 (steel bbls.)	gal.	.38	@	
68 @ 70 degrees (steel bbls.)	gal.	.37	@	
V. M. & P. (steel bbls.)	gal.	.29	@	
Toluol, pure	gal.	.31	@	.36½
Turpentine, spirits	gal.	2.35	@	
wood	gal.		@	
Oamaco reducer	gal.	.50	@	
Xylol, pure	gal.	.35	@	.45
commercial	gal.	.35	@	.40

SUBSTITUTES.

Black	lb.	.10	@	.22
White	lb.	.11	@	.24
Brown	lb.	.15	@	.23
Brown factice	lb.	.11	@	.23
White factice	lb.	.13	@	.25
Paragol, soft and medium (carloads)	cwt.	18.58	@	
hard	cwt.	18.08	@	

VULCANIZING INGREDIENTS.

Lead, black hyposulphite (Black Hypo)	lb.	.39	@	
Orange mineral, domestic	lb.	.15¼	@	
Sulphur chloride (drums)	lb.	.20	@	
Sulphur, flour, Brooklyn brand (carloads)	cwt.	3.40	@	
Bergenport brand (carloads)	cwt.	3.40	@	
superfine (carloads, factory)	cwt.	2.00	@	2.25

(See also Colors—Antimony.)

WAXES.

Wax, beeswax, white	lb.	.68	@	
ceresin, white	lb.	.16	@	
carnauba	lb.	.46	@	
ozokerite, black	lb.	.50	@	
green	lb.	.50	@	
Montan	lb.	.24	@	.26
paraffine, refined 118/120 m. p. (cases)	lb.	.11½	@	
123/125 m. p. (cases)	lb.	.12	@	
128/130 m. p. (cases)	lb.	.13½	@	
Sweet wax	lb.	.15	@	

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Vol. 62 JUNE 1, 1920 No. 3

TABLE OF CONTENTS.

Editorials:
- A Setback to Filipino Progress 555
- Guayule Is Rubber, Not a "Substitute" 555
- Balata Cultivation 555-556
- Air Fords Not as Yet 556
- Accidents in Factories 556
- Standardization and Golf Balls 556
- Minor Editorials 556

Rubber (Hevea Brasiliensis) as a Philippine Agricultural Investment. By H. F. Cameron, Lieutenant-Colonel, Engineers, U. S. A. ..... Illustrated 557-560

A Layout of a Scientific Rubber Footwear Factory. Diagrams 560-563

Recent Improvements in Testing Machines. Illustrated 563

Motor Truck Efficiency as Related to Solid and Pneumatic Tires ..... By S. V. Norton—Illustrated 564-567

Rubber Tariffs of Asia, Oceania and Africa 568-570

British Standard List of Rubber Tyres for British Standard Rims. ..... Diagrams 570-573

The Goodyear Industrial University. By Ralph C. Busbey—Illustrated 574-575

Practical Tire Repairing. By A. B. Zwebell—Illustrated 576-578

Interesting Letters from Our Readers 579-580
Further Study for Native Rubber Plants. Stevens' Sulphur Determination Method. The Rubber Situation of the Philippines. Of Pioneer Stock. Why Not American Rubber Factories in Malaysia? As to Rubber Heel Patents.

Chemistry:
- What the Rubber Chemists Are Doing 581-583
  Carbon Black. Benzol Poisoning.
- Chemical Patents 583
- Laboratory Apparatus ..... Illustrated 583

Machines and Appliances ..... Illustrated 584-587
The Mathern Tire Making Machine. Solvent Recovery System. Akron-William Tire Repair Novelties. Champion Tire Building Stands. Machine for Coating Inside of Casings. S. & B. Flexible Steel Molds. High Pressure Sectional Vulcanizer. Honeco Vulcanizer Temperature Controller. Inner Tube Valve Nut Tightener.

Machinery Patents ..... Illustrated 587
Mandrel for Tire Tubes. Machine for Making Inner Tubes. Other Machinery Patents.

Process Patents 587

New Trade Publications 588

Editor's Book Table 588
"Report of the Ceylon Chamber of Commerce for the Year 1919." "Aircraft Year Book, 1920." "Report of the Board of Trade of the Empire Cotton Committee, 1920." "Dyke's Automobile and Gasoline Engine Encyclopedia."

New Goods and Specialties 589-591
A Safety Axe for the Summer Camper. Combination Ink and Pencil Eraser. A New Overshoe Tire. A New Artificial Bait. Three New Western Tires. An Improved Step-Mat. Three Bathing Caps for Summer Days. Hair Brush with Rubber Cushion. "Adheso" Millinery Glue. Standard and Oversize Cord Tire. A New Fabric-Rubber Sole. Rubber-Insulated Coil-Box Protector. The "Celoglas" Safety Goggle. The "Willson" Safety Goggle. A Valve That Locks the Air in the Tire. Vacuum Cup Ladder Stay. "Duratop" Rubber-Coated Fabric for Auto Tops. Rubber Mats behind the Soda Fountain. It Warns when Tire Is Flat. The "Nokut" Tire Plug. A Reinforced Heel and New Half Sole.

The Obituary Record 592-593
O. S. Picher (Portrait). I. F. Stone. M. D. Bendel. J. Kaufman (Portrait). F. T. Carlton. J. P. Wileman.

Inquires and Trade Opportunities 593

The Rubber Association of America—Activities of ... 594

American Rubber Trade—News Notes and Personals 595
- Dividends 595
- New Incorporations 595-596
- Personal Mention ..... Illustrated 596
- Eastern Notes ..... By Our Correspondent 596-597
- Seamless Rubber Co. ..... Illustrated 597
- Canadian Notes 598
- New Jersey ..... By Our Correspondent 598-599
- Rhode Island ..... By Our Correspondent 599-600
- R. J. Fries ..... Portrait and Sketch 600
- Massachusetts ..... By Our Correspondent 600-601
- Ohio ..... By Our Correspondent—Illustrated 601-603
- Mid-West ..... By Our Correspondent 604-605
- Mid-West Rubber Manufacturers' Association ... 604
- Pacific Coast .. By Our Correspondent—Illustrated 605-607

Foreign Rubber News:
- Great Britain ..... By Our Correspondent 608-609
- Foreign Notes 609-610
- Japan ..... By Our Correspondent 610
- The Rubber and Cotton Trade of the Netherlands 610-611

Planting:
- Notes from the Far East 611-612
- Rubber Tree Diseases ..... Illustrated 612

Pneumatic Tread Designs Registered October, 1917, to August, 1918 ..... Illustrated 616

Patents Relating to Rubber 613-614
United States. Canada. United Kingdom. France. Germany.

Trade Marks 614-615
United States. Canada. United Kingdom. New Zealand.

Designs ..... Illustrated 615
United States. Canada.

Markets:
- Crude Rubber 617
- Highest and Lowest New York Prices 618
- Amsterdam Rubber Market 618
- Antwerp Rubber Market 618
- Reclaimed Rubber 617
- Rubber Scrap 628
- Cotton and Other Fabrics 628-630
- Chemicals and Ingredients 630-631

Statistics:
- Brazil, Pará and Manaos Exports 622
- Canada, Statistics for January, 1920 626
- Ceylon Rubber Imports and Exports 618
- Cotton Statistics 630
- Deli (Sumatra) Rubber Exports 618
- Federated Malay States Rubber Exports 618
- Italy, Statistics for November and December, 1919 627
- Java Rubber Exports 618
- Straits Settlements Rubber Exports 618
- United Kingdom, Statistics for March, 1920 627-628
- United States:
  - Crude Rubber Arrivals at Atlantic and Pacific Ports as Stated by Ships' Manifests 619-622
  - Imports by Months for 1920 618
  - Exports of India Rubber Manufactures During March, 1920 (By Countries) 624-625
  - New York Statistics, January, February and March 623
  - United States Statistics for February and March 625-626